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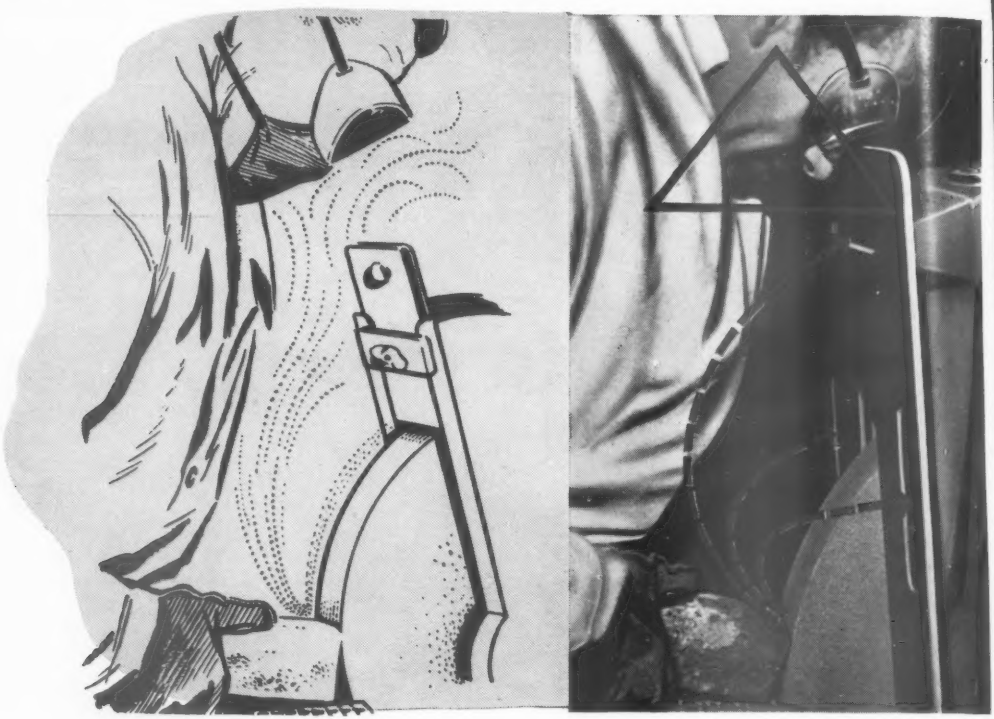

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A Step Towards Greater Safety

Possibly unique in the industrial world are the classes newly instituted by the Birmingham and District Industrial Safety Group*, which provide organized courses on subjects germane to methods designed to reduce accidents in works. There is more in safe lifting than is usually appreciated, for though the operations of the crane-driver be perfect, there remains the questions of deciding maximum load, what slings to use, etc. How does a foreman or chargehand know the weight of a box-part full of rammed sand, or the reduction in efficiency or safety of lifting tackle due to wear?

A service could be accorded to the foundry industry by manufacturers of box-parts, by the issue of tables giving the average weight of moulding boxes when full of rammed sand (or even stamping this weight on large boxes). Many cases have been reported where the load on a crane has exceeded double that which could be handled with safety, merely as a result of ignorance of the actual weight of a part. Where a top-part has been removed from a large casting bedded in the floor, the degree of its attachment to the ground is unknown, but even then there are safe means of tackling the lifting problem. What we have pointed out represents but one of the phases to be covered by the courses for crane-drivers and slingers held at the Birmingham Training Centre.†

Some courses are wider in their application than others. One designed for foremen, supervisors, and the like, covers the whole gamut of factory legislation and includes the fencing of machinery, plant installation, dust and fume removal, and cognate subjects. Another course deals with electrical installation, repair and maintenance. Just before starting to write on this subject, we read in a news paragraph that a foundry had been called upon to pay £1,665, plus an extra £832 from the Electricity Board, as compensation for an accident to an electrician engaged in correcting a fault due to a rat breaking the insulation of a piece of electrical plant. There was also the case of a cupola man who was electrocuted when changing the bulb of a portable lamp. Both cases point to the need for better training in industrial hazards. Yet a further course covers the safe working of industrial and fork-lift trucks. Other courses cover engineering requirements, but as foundries, unfortunately, rank high amongst industries prolific in accidents, it is, we deem, necessary to stress all possible means of their reduction. Even a short visit to this Centre can be rewarding, as there are on show a great many devices designed to make workshops safer.

* At Summer Road, Acocks Green, Birmingham, 27.
† See page 406 of this issue.

Production Exhibition and Conference at Olympia

The Production Exhibition and Conference organized by the Institution of Production Engineers was opened at Olympia, London, on May 23 by Mr. Iain Macleod, M.P., Minister of Labour, and closes to-day. Sir Leonard Lord is president of the Institution. Some 16 papers will have been presented, the theme being "Investing in Success" a title adopted from a now-famous speech by Mr. R. A. Butler when he was Chancellor of the Exchequer—he then said that by investing in success the U.K. standard of living could be doubled in 25 years. The conference papers were devoted to a study of how this desirable objective could be achieved. Amongst the papers presented last week was one by Mr. Henry Spencer, managing director, Richard Thomas & Baldwins, Limited, and chairman of Council, British Institute of Management, who adopted the theme of the conference as the title of his paper. Mr. Peter Spear, director of research, Rubery, Owen & Company, Limited, Darlaston, South Staffs, spoke on investing in research, and Dr. Alexander King (DSIR) took automation as his subject. Better fuel utilization and numerous ways in which it could be accomplished was discussed by Mr. L. Clegg. A paper on "Investing in Atomic Energy" was presented by Mr. F. M. Greenlees of the United Kingdom Atomic Energy Authority; Mr. D. T. Myers contributed a paper on "Factory Design, Construction and Layout," and a contribution on "International Co-operation for Productivity" was presented by R. Gregoire and E. Fletcher. Also at the conference session, the Right Honourable Lord McCorquodale, vice-chairman of the British Productivity Council, presented prizes to the eight United Kingdom winners of the productivity essay competition.

B. & F. Golf Competition

A record turn-out was a feature of the annual competition organized by Bradley & Foster, Limited, for the T. A. McKenna Cup which was played over the Whittington Barracks golf course (near Lichfield) on Friday last. Even quite heavy showers failed to damp the ardour of the contestants—or, seemingly, adversely affect the scores returned. Mr. C. Whitehouse of John Hill, Limited, was the winner (net 68) and Mr. H. J. Hall (Chamberlin & Hill, Limited) and Mr. H. G. Turner of Tipton Enamel Company, were second and third, respectively (net 69 and 70).

After having tea in the club-house at the close of golfing, the competitors and other guests of the company foregathered for dinner in the George Hotel, Lichfield, at which Dr. J. E. Hurst, C.B.E., J.P., F.I.M., deputy chairman and managing director of Bradley & Foster, Limited, presided, the assembly numbering about 70. Following the "Loyal Toast," Dr. Hurst officially welcomed newcomers to the function and also those to whom the event was, he hoped, an annual pleasure. Particularly, he welcomed Mr. Froggatt, a director of the Staveley Iron & Chemical Company, Limited, the parent organization, the Mayor of Lichfield, Councillor H. Taylor (Sheriff of Lichfield), and Mr. K. Marshall, director of the Joint Iron Council. The Mayor distributed the awards—that is, with the exception of the second prize for which he himself had qualified; this was handed to him by the Sheriff. Mr. Marshall voiced the thanks of the competitors and the assembly generally to Dr. Hurst and his colleagues and the evening concluded with light entertainment.

Luncheons

FOUNDRY COKE MERCHANTS' ASSOCIATION

The annual luncheon of the Foundry Coke Merchants' Association was held at the Waldorf Hotel, London, on May 24. Mr. R. J. McDonald (McDonald, Muter & Company, Limited) the chairman, presided. Among the guests were Mr. J. Y. Feggetter, Mr. H. H. Prosser, Mr. W. Armstrong, and Mr. C. B. Hardwick. In proposing the toast of "The Guests," Mr. McDonald referred to the unavoidable absence of Mr. Leslie O'Connor and Mr. C. Sullivan, but was delighted to welcome Mr. Feggetter, Mr. Prosser and the other official guests as well as all the guests invited by members. He referred to the unending assistance rendered by Mr. Feggetter to the foundry coke trade, and the splendid support he had received during his three very happy years as chairman of the Association, from which he was now retiring. As the principal guest, Mr. J. Y. Feggetter responded and paid tribute to the Association and to Mr. McDonald for the manner in which he had conducted their affairs.

At the annual general meeting of the Association, which followed the luncheon, Mr. Edwin Tasker (Darby & Company (Birmingham) Limited), was elected chairman for the ensuing year, Mr. R. J. McDonald, deputy chairman, and Mr. W. Pratt (Crooke & Company, Limited, London) remains chairman of the London section of the Association.

Basic Training for the Metallurgist

When the Institution of Metallurgists convened in London for its annual luncheon and general meeting it chose as its new president Mr. G. L. Bailey, director of the British Non-Ferrous Metals Association. In his presidential address Mr. Bailey laid particular stress on the need for broad training in the humanities and basic science as a preliminary to specialist instruction in metallurgy. He said he felt that metallurgy offered a most attractive and exciting opportunity for new development, in spite of some competition with other materials.

At the luncheon, the principal speaker, Sir David Eccles, Minister of Education, had made reference to the part played by the Institution in the furtherance of technological education. He considered that the Institution had made substantial progress in this field in a comparatively short time.

Among the other officers elected at the meeting were Mr. J. Mitchell, a director of Stewarts and Lloyds, Limited, who became senior vice-president, and Mr. W. E. Ballard, a director of Metallisation, Limited, Dudley, and Mr. A. J. Murphy, formerly Professor of Industrial Metallurgy at Birmingham and now Principal of the College of Aeronautics, who were chosen as vice-presidents.

Latest Foundry Statistics

As reported by the British Bureau of Non-Ferrous Metal Statistics, the output of copper-base castings during March was 6,676 tons. The production for the first three months of this year was 20,284 tons, which is 2,826 tons more than for the same period in 1955.

"Properties of Aluminium and Its Alloys."—An error has been pointed out in the price quoted for this book when it was reviewed on page 305 of the JOURNAL for May 10. The correct price is 7s. 6d. (not 7s. 1d.) and copies are available from the Aluminium Development Association, 33, Grosvenor Street, London, W.1.

MR. J. A. WILKINS joined the Stanton Ironworks Company Limited, in 1951 as foundry engineer, and is engaged on development of the foundries and spun-pipe plants. He began his career as a draughtsman with George Fletcher & Company Limited, Derby, followed by two years in the drawing office of Henry & Coles Limited. Subsequently in 1938, he joined the Butterley Company, Limited. In 1940, he became assistant to Mr. J. W. Gardom and remained as senior engineer with John Gardom & Company until 1951. Mr. Wilkins is the senior vice-president of the East Midlands branch of the Institute of British Foundrymen.

Dust and Fume Extraction in Foundries*

By J. A. Wilkins

The Author takes the various clauses of the Iron and Steel Foundries Regulations, 1953, *and considers them stage by stage in respect of the obligations laid upon founders in relation to dust and fumes and the means available for their elimination. After a brief reference to mould drying, a detailed examination is carried out on knock-out ventilation; various systems, their advantages and drawbacks are described. Special attention is given to methods available in mechanized foundries and to the limitations imposed when large boxes or jobbing work are involved. Next, dressing and fettling operations are discussed; again, attention being directed also to the requirements for treating large castings. Finally, there is a section devoted to dust collection and disposal and the relative efficiencies of plant available for these purposes. One of the major implications arising from the Author's work is that knock-out hoods and fume extraction devices can best be "tailored" to suit local conditions, and there is no system which can be universally applicable. Another important point is the use which can be made of baffle plates and frames at exhaust intakes so to confine the extraction more nearly to the area of generation of dust and give greater velocity*

The subject of dust and fumes in foundries has been receiving increasing attention by a great number of people, both inside and outside the foundry industry during recent years, and the stage has been reached where the Iron and Steel Foundries Regulations, 1953, came into operation in their entirety on January 1, 1956. The regulations concerning Arrangement and Storage of Mou'ding Boxes, etc., and Bulk Storage of Sand and Metal; Work to be carried out near Cupolas; Gangways and Pouring Aisles; and those relating to protective equipment, have been in force since January, 1954. These regulations are straightforward, and can be relatively easily interpreted and applied. The sections which came into effect on January 1, 1956, are under the headings of Dust and Fumes, and Bathing Facilities, and Clothing Accommodation. The arrangements to be made, for providing bathing facilities are quite clear, and the cost will have to be borne by the industry. In the case of dust and fumes, the position is more complicated, because of the varied nature of the dust- and fume-producing operations, but the legal phraseology of the regulations is couched in such a manner as to provide a reasonable degree of flexibility.

Open fires, either for space heating, or mould- and core-drying, etc., are, with certain exceptions, not permitted. Various methods of complying, with the space-heating requirements, are available, from solid-fuel-fired industrial heating-stoves, to the numerous types of panel, and radiant heaters, utilizing hot water, steam, gas or electric power.

Mould Drying

In the case of drying moulds *in situ*, the Regulations prohibit the use of open fires, except in circumstances in which the use of such fires is unavoidable. Here again, much can be done to improve the working conditions by the use of gas, coke, oil or electric hot-air dryers. Mould- and core-drying stoves should be designed and maintained in such a manner that injurious fumes are not emitted into the shop, during working hours. The worst period in the stoving cycle is that when the doors are opened for withdrawing the dried mould or core, when a large volume of fume is instantaneously released into the shop. This can be dealt with, either by means of a well-designed hood located immediately above the stove door, or by adequate roof ventilation.

Knocking-out

The most difficult section of the Regulations is that concerning knocking-out operations (because of the extremely large volumes of dust and fumes which are produced), in relation to problems associated with the production of castings ranging from a few ounces on fully-mechanized plants to large pit-moulded castings.

The Regulations state that "All knock-out operations shall be carried out:—

(*a*) in a separate room, or in a separate part of the foundry, suitably partitioned off, being

* Paper read before the East Mid'ands branch of the Institute of British Foundrymen.

a room or part in which, so far as reasonably practicable, effective and suitable, local exhaust ventilation, and a high standard of general ventilation are provided; or,

(*b*) in an area of the foundry in which, so far as reasonably practicable, effective and suitable local exhaust ventilation is provided, or where compliance with this requirement is not reasonably practicable, a high standard of general ventilation is provided."

Knocking-out is essentially the separation of castings from the sand, and during the breakdown of this sand mass, considerable volumes of steam are released, and further steam is generated as the moist backing sand comes into contact with the hot casting. A lesser amount of gas is evolved from the cores, and the carbonaceous matter in the moulding sand. This steam and gas, together with air which is being heated by the hot castings, all rise with considerable velocity, carrying into the general shop-atmosphere, particles of dust, composed of a number of constituents, such as coal-dust, ash, clay, sand, etc.

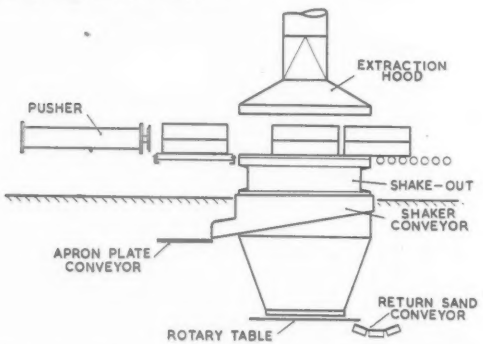


FIG. 1.—*Diagrammatical set-up of a knock-out utilizing an extraction hood positioned immediately over the knock-out station.*

The upward velocity of these thermal currents caused by knocking-out, is normally of the order of 200 to 300 ft. per min., immediately above the casting, and air velocities in this range are capable of carrying dust particles up to about 200 microns in size. (A micron is 0.00004 of an inch, and thus the size of particles, carried by an air stream travelling at 300 ft. per min., is approximately 0.008 in., equivalent to the aperture of a sieve number of 72, or, in other words, a medium sand).

At this point it must be emphasized that it is contended that the size of the dust particles which are injurious to health is below 5 microns, and therefore, dust of this nature is very easily carried into the general shop-atmosphere. On the other hand, these light particles are very easily entrained in an air stream for collection.

Hoods

Vertical

It is quite obvious that the most efficient way in which the dust and fumes which are carried in these thermal currents can be prevented from entering into the shop atmosphere is to utilize the upward trend of the gases, by positioning a suitable extract hood immediately over the knock-out station. This is readily applicable to a fully mechanical knock-out, and Fig. 1 shows a diagrammatical set-up of a knock-out of this type. It will be seen that by the utilization of a pusher the mould is transferred from the mould conveyor on to the shake-out machine, the sand and castings fall through the grid, the castings being delivered by shaker conveyor to an apron plate conveyor; the moulding sand falls through into the hopper, for feeding by rotary table on to the return conveyor. The extraction hood is in close proximity to the upper surface of the mould, and because the hood is directly in the path of the gases, a face velocity in the region of 200 to 250 ft. per min. is adequate efficiently to extract the dust and fumes.

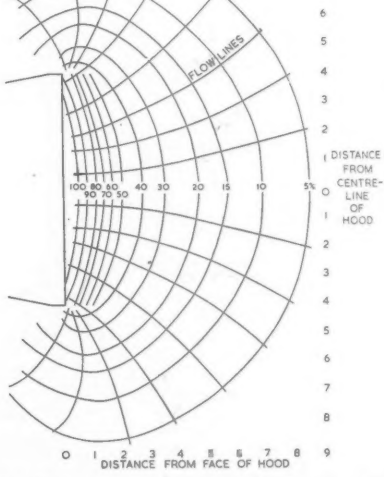

VELOCITY LINES
FLOW LINES
100 80 60 90 70 50 40 30 20 15 10 5%
DISTANCE FROM CENTRE-LINE OF HOOD
DISTANCE FROM FACE OF HOOD
0 1 2 3 4 5 6 7 8 9

FIG. 2.—*Velocity and flow lines from a plain hood from which the face velocity required to divert fumes into the hood can be established.*

Side

Since the majority of mechanized foundries are not able to employ fully automatic shake-outs and it is necessary to manhandle boxes and castings, the extraction may have to be of the side-hood type. Now it is quite obvious that with side extraction the rising column of dust and fumes has to be diverted from the vertical, and the degree of diversion is dependent upon the angle at which the stream of air entering the side hood crosses the

rising column from the knock-out, and also upon the relative velocities of these two streams.

The angle at which the air stream crosses the fume stream is governed by the physical positioning of the extraction hood; and its velocity at the intersection is dependent, first upon the air velocity at the face, and secondly on the distance between the hood face and the vertical column of rising fumes. In the same way in which the intensity of light on an object varies inversely as the square of the distance of the object from the source of light, theoretically, the velocity of air varies inversely as the square of the distance from the source. Since the entrance of an extraction hood is an area and not a point, however, the stream of air entering a hood does not conform exactly to theory, but is variable from the centre to the outside, as shown in Fig. 2. It will be seen that the velocity of air in the centre of the stream is somewhat higher than the theoretical value, whereas the velocity towards the outside is lower, due to the frictional resistance of the surrounding atmosphere. From these curves can be established, within reasonable limits, the face velocity required to divert fumes carried upwards by the thermal currents.

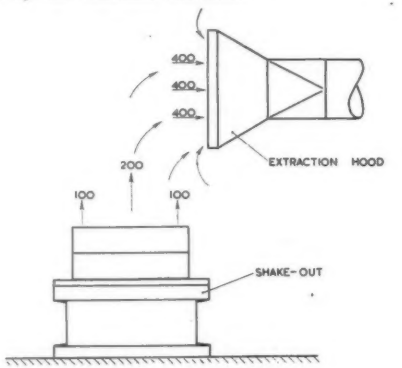


FIG. 3.—*Typical side-hood extraction system, operating over a 6- by 4-ft. shake-out machine, showing the relative velocities.*

Fig. 3 shows a typical side-hood extraction system operating over a 6 by 4 ft. shake-out machine. The velocities of the thermal currents vary, from 100 to 200 ft. per min., and the extraction hood is 6 ft. long by 3 ft. deep. The hood face-velocity required is approximately 400 ft. per min. and thus the volume of air being extracted is 7,200 cub. ft. per min. This is a considerable volume of air for an installation of this size, and Fig. 4 shows it can be reduced, without losing efficiency of extraction. By confining the extraction area of the hood to a band 12-in. wide around its periphery, the total volume of air to be extracted is reduced to 4,000 cub. ft. per min.

This considerable reduction is achieved without loss of efficiency, and in effect this type of hood provides an air curtain around the dust laden area. A slight additional improvement in efficiency can be obtained by fitting a flange plate to the hood, in order to prevent air entering from the sides. This system is readily applicable to small and medium size knock-out installations, both as shown, and also as illustrated in Fig. 5, where the method of handling boxes allows the hood to extend over the knock-out station.

Fumes from Casting

The same type of hood can readily be applied to the casting and fuming sections of mechanized plants, one such installation being that shown in Fig. 6, where casting is taking place from an overhead telpher system. The principle of reducing the area of the hood face is again clearly shown, the extraction area consisting of two apertures running the full length of the hood. The face velocities at the casting station require to be higher than those along the fuming section, and in this case velocities of 300 and 200 ft. per min., respectively, have been assumed to be adequate. The overall length of this hood is 84 ft. made up of sections 6 ft. long, each being fitted with dampers to enable equalization of air velocities to be carried out.

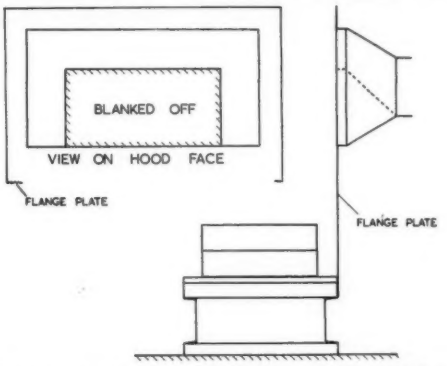


FIG. 4.—*Hood fitted with a centre baffle and flange plate for increasing local velocity and preventing entry of air from the sides.*

Catering for Special Conditions

A most effective type of hood for the casting section of mechanized plants, where the downgate position is constant, is that shown in Fig. 7, and in this arrangement the hood can be extended down to within a few inches of the top surface of the mould, entrapping the fumes well below the breathing zone of the operators. It is possible completely to enclose the fuming section as shown, thus considerably reducing the volume of air to be extracted.

As the size of moulding box and casting increases, so do the problems of dust and fume extraction, because the necessity of handling by overhead means, eliminates the use of overhead hoods. Side hoods are of only limited efficiency, because their effectiveness rapidly decreases with the increase in distance over which they have to

operate, as was indicated in Fig. 2. Their installation would, in many cases, also result in a loss of production because of interference with the movement of boxes, castings, etc. Designers are driven, therefore, to the adoption of the down-draught system of extraction, which is a very much less efficient method, because complete reversal of the natural thermal currents is necessitated. Few systems of this type are completely effective, and it is necessary to couple them with good general ventilation, to remove fumes which escape into the shop atmosphere.

An example of a down-draught system applied to a 13 by 8 ft. vibratory shake-out, handling large boxes, is shown in Fig. 8. The boxes being dealt with are 10 by 6 ft. and the grid face velocity of air is approximately 300 ft. per min. On a machine of this size the total volume of air being extracted is 31,000 cub. ft. per min., and the velocity of air at the mouth of the extraction ducts, is 1,300 ft.

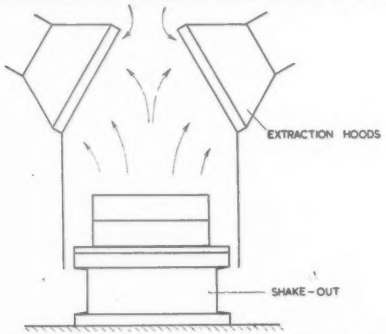


FIG. 5.—*System applicable to small and medium knock-out installations where the method of handling moulds permits the hood to extend over the knock-out station.*

per min. When the moulding box is first placed on the grid, extraction takes place around its perimeter. As the sand falls through into the hopper, air is pulled in through the box, drawing the steam and hot gasses from the casting into the exhaust system. Obviously the efficiency of the down-draught system is very largely dependent on the depth of box being used. When combined with a good general-ventilation system, working conditions in the shop are maintained in a satisfactory state.

The main disadvantage with down-draught systems of extraction, is that owing to the high velocities of the air being drawn through the path of the falling sand, much of its clay content is sometimes removed, and also sand grains up to 200 microns in size are readily extracted. This not only effects a physical change in the sand, but may also cause abrasion of the ducting. It should be emphasized that if the grid becomes blanketed by the mould and sand, the efficiency of the exhaust system is greatly impaired, because the resistance built up overcomes the capacity of the exhaust system.

Jobbing Foundries

In jobbing foundries, the only practical manner in which the Regulations can be implemented is by transporting cast moulds to a separate knock-out area, where one or a combination of any of the previous exhaust systems can be installed, depending upon the operating conditions. In the case of pit-moulded work, very little in the way of *local* exhaust ventilation can be arranged, and it appears that the only steps which can be taken are to provide good general-ventilation conditions. Various methods are available for accomplishing this, ranging from natural-draught stacks and louvres, to fan-assisted ventilators and hinged roof-shutters, which can be

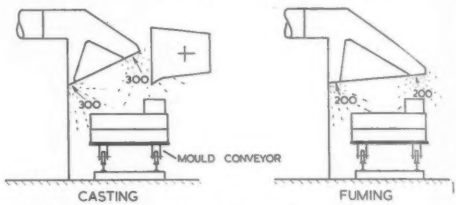


FIG. 6.—*Similar type of hood to that in Fig. 5 applied to both the casting and fuming sections of a mechanized plant.*

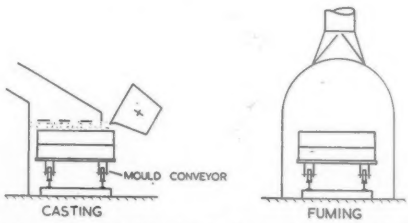


FIG. 7.—*Type of hood which can be applied to the casting section of mechanized plants when the downgate is in a constant location. The hood can be extended to within a few inches of the top surface of the mould.*

adjusted to suit internal conditions and the prevailing atmospheric conditions.

The wearing of an approved type of mask is to be encouraged in this type of foundry, particularly during casting and knocking-out operations. Two types approved by Her Majesty's Inspector of Factories are the Mark IV and the Microfilter. It has been found, from practical experience, that it is possible for men to wear these, from one-half to threequarters of an hour, without undue discomfort.

Dressing and Fettling

Although the problems connected with the knocking-out of castings are the most varied and difficult of the Regulations, the dressing and fettling operations also create heavy dust-concentrations. The Regulations call for all dressing and fettling operations to be carried out—

(*a*) In a separate room or in a separate part of the foundry suitably partitioned off; or

(*b*) in an area of the foundry set apart for the purpose; and shall, so far as is reasonably practical, be carried out with effective and suitable local exhaust ventilation, or other equally effective means of suppressing dust, operating as near as possible to the point of origin of the dust.

The implementation of sections (*a*) and (*b*) of the dressing and fettling operations, is more easily

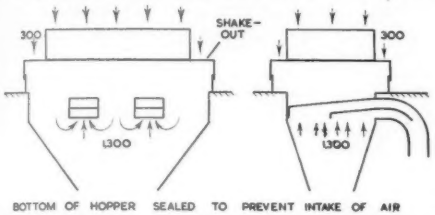


FIG. 8.—*Example of a down-draught system applied to a* 13- *by* 8-*ft. vibratory shake-out, handling large boxes.*

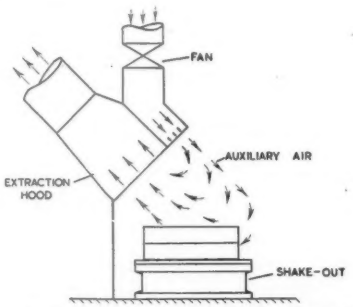


FIG. 9.—*Extraction system utilizing auxiliary air from outside the shop. An advantage of this system is that the shop air remains undisturbed, draughts are avoided, and uniform working conditions are maintained.*

carried out than for the corresponding sections of the knocking-out regulations, since the castings are at that stage separate entities and can be handled individually. The initial operation in the cleaning and dressing process is the removal of adhering sand. In the case of the smaller range of castings, this can be performed mechanically, in such equipment as plain rumbling-barrels, barrel-, apron-, rotary-table- and conveyor-type shot-blast machines. Dust extraction from these machines is relatively simple, being arranged through the trunnions of barrel-type machines and overhead from the apron- and rotary-table-type machines.

Blasting Large Castings

In the case of the large castings, adhering sand is removed in room-type shot-blast plants of various designs, ranging from the rotary-table type to the bogie type, both being operated either by impellers or hand-controlled nozzles. Dust exhausting from these plants is arranged through the floor grids, with "breathers" in the roof, so that clean air is drawn downwards past the operator, conforming with the natural tendency of the sand to fall. The number of changes of the air in such a room is determined by conditions, and is usually in the region of six to eight times per minute. This high number of changes is mainly a provision to ensure maximum visibility. Clean air is also fed into the operator's helmet.

A satisfactory way of eliminating dust during the removal of adhering sand from castings is by the use of water. Water, when ejected from a nozzle at high pressure, can perform the cleaning operation, carrying with it the sand and dust as it drains away. The object of the cleaning process is to enable, as far as possible, sand-free castings to be passed forward to the fettling section for the chip-

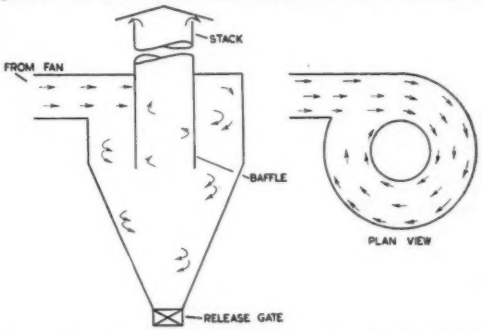


FIG. 10.—*Simple cyclone type of dust-collection system, employing centrifugal force, together with the reduction of velocity to separate the dust out of the air stream.*

ping and grinding operations to be carried out. At that stage, dust is mainly caused by the chippers disturbing sand which has fused to the surface of the castings, and in the case of grinders, it also originates from the grinding wheels and the metal being ground.

Dust from Grinders

Work has been carried out by the British Cast Iron Research Association and the British Steel Castings Research Association on the subject of dust control from grinders and manufacturers are now marketing duplex pedestal grinders incorporating the systems that were devised by these organizations. The majority of fettling of small castings is carried out on this type of grinder, but where these prove unsuitable, a properly designed work-bench with adequate exhaust arrangement may be employed, for both hand grinding and chipping.

Most of the fettling of large castings takes place on the floor of the shop, and the only means of applying local dust-exhausting to such work is to position the casting in front of a hood during the process. The principle of this system is similar to that described for a side hood on a knock-out,

but the extraction velocities used need not necessarily be so high, because the extraction system has no thermal upcurrents to overcome.

Adequate dust-exhausting arrangements have been incorporated in the design of swing-frame girders, and considerable thought and attention is being given by the manufacturers to the problem in connection with hand chipping and grinding tools.

The relatively new principle of high-velocity, low-volume extraction at the point of contact of the tool with the work-piece, is being adopted, and its use is on the increase.

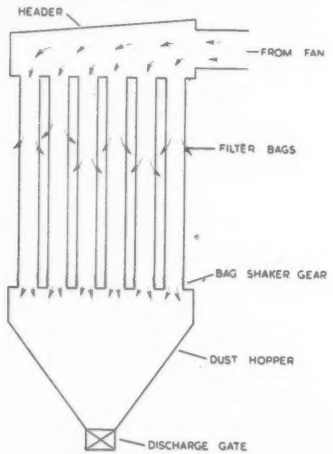


FIG. 11.—*Diagrammatic cross-section of a bag-type filter.*

Cold Air for Extraction

It must be emphasized that all the extraction systems mentioned earlier, except the high-velocity, low-volume type, remove considerable volumes of air from the shop atmosphere, this air having previously been heated to provide reasonable working conditions. This constitutes an appreciable waste of fuel and money, and a saving can be made by supplying air drawn from outside the shop, to pass through the extraction system in the manner shown in Fig. 9. The cool incoming air by-passes the general shop air, but inevitably a small amount of warm shop air is drawn through the system. A further advantage of this system is that since the shop air remains undisturbed, draughts are avoided and uniform working conditions are maintained. All fixed extraction systems should utilize the principle of supplying auxiliary air, thus reducing both the installation and fuel costs for shop heating.

Dust Collection

Having removed the dust from the areas dangerous to the workmen, and entrained it in an air stream travelling up to, or in the region of 3,000 ft. per min., it remains next to separate the dust from the air stream in the most efficient manner. There are several ways in which this can be accomplished, ranging from the simplest expansion chamber to the highly-efficient electrostatic precipitator. In the simple expansion chamber, the duct carrying the dust-laden stream of air is led into a large chamber or box, where the velocity of the air stream drops rapidly, and allows the dust to fall out of suspension. A stack of large diameter leading from the roof of the chamber conveys the relatively dust-free air, at low velocity, to atmosphere.

The next development of dust-collection apparatus is represented by the simple cyclone, and

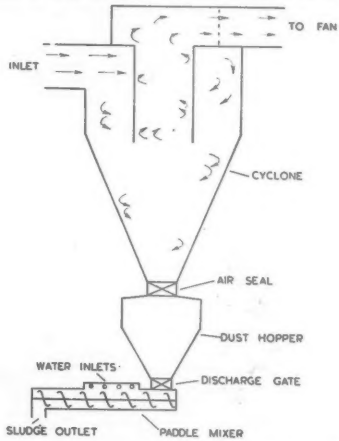


FIG. 12.—*Method used to convert the dust into sludge during discharge from a cyclone. Use is made of a totally-enclosed paddle mixer with water feed, the efficiency of mixing being assisted by the addition of a wetting-agent.*

Fig. 10 shows the principle of its operation. It employs centrifugal force, together with reduction of velocity, to separate the dust out of the air-stream, and the dust is collected in the conical base, the clean air again passing out of a stack at the top of cyclone. From Fig. 10 it will be seen that side entry of the dust-laden air assists the centrifugal action to take place, and the internal baffle causes the maximum change of direction of the air, in order to throw out the dust particles.

Filters

Cloth filters are yet more efficient than cyclones, because in addition to a reduction in velocity, the air passing through such a system is also subjected to a pure filtration process. Fig. 11 shows a diagrammatic cross-section of a bag-type filter. Upon entering the header, a reduction in velocity of the air occurs, allowing the larger particles to fall from the air stream. The remaining dust is carried to the cloth surface through which the air passes, leaving the dust adhering to the cloth. This helps

to increase the dust-collecting efficiency until such time as too-thick a coating of dust is formed on the filter, when it becomes necessary to shake it off. This should only be done when the exhausting system is shut down and it may therefore be necessary to have the system so arranged as to be able to have one section in use, whilst in the other the bags are being shaken clear.

Cloth filters should not be used if moisture or vapour is present in the air-stream in sufficient quantity to cause the dust to cake or stick to the cloth, so that rapping or shaking will not remove it. They are well adapted to dry dust, giving high collection-efficiencies, but should not be used when temperatures above 180 deg. F. are met with, unless special fabrics be used. The filter bags themselves are normally made from a closely woven cotton fabric, and because of this are susceptible to physical damage. Care should be taken, therefore, to exclude coarse material from the air stream before it enters a cloth filter.

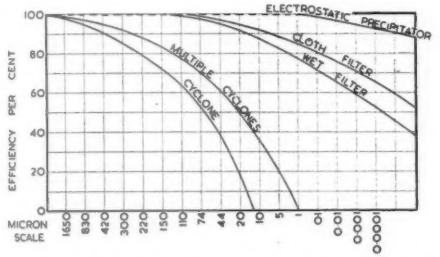


FIG. 13.—*Comparative approximate efficiency of dust-suppression equipment according to particle size.*

Multiple cyclones or a combination of cyclones and cloth filters can be utilized to give added efficiency. In particular, the efficiency of a cloth filter can be used to full advantage in fettling shops, provided that metal in the air stream is first removed by a simple cyclone.

Disposal

One disadvantage with these dry collection methods is the disposal of the dust, since the persons engaged in this occupation are subjected to unpleasant working conditions. Also a considerable amount of dust is very often blown back into the workshops. Steps should be taken to convert the dust into sludge during discharge, and this can be accomplished in a totally-enclosed paddle-type mixer, or screw conveyor with a water-feed, as shown in Fig. 12, efficiency of mixing being assisted by the addition of a wetting-agent. It should be noted, however, that where ferrous dust is present, the blades of the mixer should be well cleaned after use, to remove the residue, which would otherwise oxidize and become cemented to the moving parts.

Wet Filters

Wet filters are not new, but they are becoming increasingly popular. The principle of operation of wet filters is that the dust-laden air is passed through a cascade of water and, as the surface of the dust particles is wetted, the particles become entrained in the water stream. The action of the air stream increases the dispersement of the water so that the air is passed through a mist, and the dust retained by the water either settles in the unit itself or is carried to a de-watering tank.

Even after wet collection, a small amount of dust remains entrained in the air being passed to atmosphere and removal of this dust can be accomplished by electrostatic precipitation. Electrostatic precipitators are most effective for dusts in the lower micron range, *i.e.*, in sizes around 40 to 50 microns, and are therefore best used as a secondary means of cleansing an air-stream. When used to remove large volumes of dust, build-up occurs on the electrodes, which reduces their efficiency by creating a resistance to the ionizing field.

Relative Efficiencies

Fig. 13 is a chart depicting the comparative efficiencies of the various types of collection units. It will be seen that the simple cyclone is completely ineffective in removing dust particles in the 1- to 5-micron range, and therefore quite unsuitable as an agent of collection inside a shop. Multiple cyclones are a little more effective but, even so, dangerous dust is still emitted and therefore the previous remarks apply. Wet-filtration methods eliminate a larger proportion of the more dangerous dusts being passed into the atmosphere, but are still only 75 to 85 per cent. effective in the injurious range of dust particles. This somewhat surprising inefficiency is due to the fact that it is difficult to wet the very small particles.

Cloth filters are still regarded as being most efficient, and the chart shows that they are between 80 and 90 per cent. efficient in the dangerous range. Their effectiveness is, of course, dependent upon the fineness of the material used for the bags, and their physical condition. Electrostatic precipitation is highly efficient but, as stated earlier, precipitators should not be overloaded with heavy particles, but reserved for the final cleansing.

The Author would like to record his thanks to the Stanton Ironworks Company, Limited, for permission to present this Paper.

Fifth World Power Conference

Copies of the general programme for the fifth World Power Conference, to be held in Vienna from June 17-23, are now available from the secretary of the British National Committee, World Power Conference, 201, Grand Buildings, Trafalgar Square, London, W.C.2. The general programme gives the itineraries of a number of alternative post-conference technical tours, some of which extend from Austria into the frontier regions of Germany, Italy, and Yugoslavia. Visits will be paid to hydro-electric power stations, thermal stations, and industrial establishments as well as to places of scenic and historical interest. A list of 27 papers to be presented by the British National Committee is available from the address above. It is understood that some 300 papers in all have been submitted to the Austrian National Committee.

Iron and Steel Statistics

The following summary of 1955 statistics is published by courtesy of the Iron and Steel Board and the British Iron and Steel Federation.

	1938.	1946.	1954.	1955.
	Million tons.			
STEEL SUPPLY (ingot equivalent):				
Crude production	10.40	12.70	18.52	19.79
Imports	0.97	0.48	0.47	1.86
Total supply‡	11.22	14.13	19.49	21.57
Exports	1.98	2.30	2.90	3.36
Home deliveries	9.24	11.83	16.59	18.21
IRONMAKING:				
Home ore consumed	11.72§	9.85	10.51	9.90
Imported ore consumed	4.63§	5.31	9.16	8.76
Sinter consumed	—	2.28	5.89	7.72
Coke consumed	7.59	8.54	11.88	12.25
Pig-iron produced	6.76	7.76	11.88	12.47
Output per furnace in blast ('000 tons)	68.6	79.3	118.6	126.4
STEELMAKING:				
Pig-iron consumed	4.84	6.09	9.77	10.43
Scrap consumed	6.13	7.65	10.29	11.09
Alloy steel produced	10.40	0.54	1.05	1.22
Non-alloy steel produced		12.16	17.47	18.57
Output per open-hearth furnace ('000 tons)	36.5	36.8	58.0	60.1
FINISHED STEEL OUTPUT (gross):				
Heavy rails and accessories	0.49	0.47	0.63	0.60
Plates	1.37	1.63	2.49	2.45
Heavy sections and bars	1.54	1.69	2.40	2.48
Light rolled products	2.25	3.43	4.80	5.44
Sheets	0.82	1.13	2.04	2.25
Tinplate, terneplate, and blackplate	0.61	0.58	0.87	0.89
Tubes, pipes, and fittings	0.67	0.75	1.11	1.26
Tyres, wheels, and axles	0.16	0.21	0.29	0.29
Forgings (excl. drop forgings)	—	0.13	0.20	0.20
Castings	0.14	0.20	0.30	0.31
STEEL OUTPUT AND PRODUCTIVITY (1948 = 100):				
Total volume of output	65	83	124	133
Output per man-year	79	90	119	126
LABOUR:¶				
Numbers at work (000)	—	272	280†	285†
Average weekly earnings (£)	—	6.3	10.7†	11.8†
Average hours worked	—	47.5	46.9†	47.0†
PRICES (Board of Trade indices 1938=100):				
Iron and steel	100	151	263	276
Coal	100	—	364	399
Basic materials	100	—	498	529
All articles	100	173	325	336
IRON CASTINGS OUTPUT (million tons):	—	2.54	3.74	3.93
INDUSTRIAL PRODUCTION (1948 =100):				
Metal processing	—	84	140	153
All industries	—	87	130	136
VOLUME OF EXPORTS (1950= 100):				
Iron and steel	—	—	102	115
Metal processing	—	—	102	110
Total exports	—	—	104	111

‡ Adjusted for producers' stock change; includes re-usable material. § Includes ore used in sinter production. ¶ In ore mines, coke ovens, blast furnaces, steelworks (inc. sheet, tinplate and tube works), steelfoundries, and wrought-iron works. The statistics relate to the first week in July. † Not entirely comparable with earlier years.

EXHIBITS by Philips Electrical, Limited, at the SIMA Exhibition of "Atoms, Electrons and Industry," opening at the Royal West of England Academy, Bristol, on June 6, will include a hand and clothing monitor for checking contamination of personnel employed in the handling of radio-active substances; a contamination meter for laboratory monitoring of gamma activity; a test set for routine checking of nuclear counters and components; and a pulse analyser for measuring the amplitude distribution of pulses produced by any type of nuclear-particle detector.

Patents Abridgements

One of the services which the Patent Office renders to industry is the publication of abridgements of accepted patent specifications. These give essential particulars of such specifications in a concise form with line drawings where necessary, and show the trend of invention in the United Kingdom. They provide a quick and ready means of enabling inventors to find out whether their ideas have been anticipated.

The abridgements are published in series of 20,000 specifications, divided into 44 groups, each group covering a field of invention. Initially they are sold in sets of sheets, each part consisting of 16 pages and containing about 50 abridgements. Individual volumes are then assembled and indexed by subject and name of applicant.

During the last war, the publication of abridgements had to be suspended, but the Board of Trade announces that group volumes of specifications accepted during the war period are now on sale. This closes the gap between pre-war and post-war volumes, and a complete range of volumes is now available up to and including the 640,000-660,000 series, which includes specifications accepted and published prior to November, 1951. Abridgements in sheet form are also on sale in respect of specifications accepted and published prior to August, 1955.

The volumes in bound and sheet form can be obtained from the Sale Branch, Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2, at prices varying from £1 1s. to £1 10s. per group.

New Abbey Works Extension

Designed to increase the production of steel ingots from 2,400,000 to 3,000,000 tons per annum by 1960, a third development plan for the Abbey Works, Port Talbot, of the Steel Company of Wales, Limited, has been approved by the Iron and Steel Holding and Realization Agency. An immediate start is to be made with the work.

The plan was prepared by the company at the request of the Iron and Steel Board and has received the board's consent. It provides for the conversion of steel ingots into sheets, plates, and tinplate to assist in meeting the expected increase in demand for flat-rolled steel products by 1960. It is estimated that the plan will involve expenditure at the rate of £12,000,000 per annum for four years, a large proportion of which will be found from internal sources. A new coal washery capable of handling 250 tons of coal per hour will be constructed and 80 new coke ovens will be erected on a new site at the south-west end of the Abbey Works. A fifth blast furnace, with a hearth diameter of 30 ft. 3 in., will increase pig-iron production by 10,000 tons to a total of 40,000 tons weekly. A new steel shop will produce by the Bessemer process (three 50-ton converters) all the additional steel required. It is proposed to make two grades of pig-iron —one of about 1.6 per cent. phosphorus and the other about 0.4 per cent. phosphorus.

KELVIN & HUGHES, LIMITED, will occupy a stand in the British section of the Polish International Trade Fair from June 17 to July 1. Three divisions of the company, and Simplex-Ampro, Limited, will be represented. All the instruments and display material will be packed into a company's van which will be shipped to Gdynia, accompanied by Mr. C. H. Oliver, of the firm's publicity department.

Council of Ironfoundry Associations

Annual Report on 1955 *Activities*

The report of the Council of Ironfoundry Associations, for 1955, which was presented at the fourteenth annual meeting in London last month, has now been published and a limited number of copies are available to readers on writing to the CFA at 14, Pall Mall, London, S.W.1. Extracts are reproduced in what follows:

By producing close on 4,000,000 tons of castings in 1955, the ironfounding industry set up a record of which it can be justly proud. In 1945, the total was under 2,000,000 tons, so that output has practically doubled in the post-war decade. The resourcefulness of ironfounders in overcoming the difficulties caused by the railway strike in May drew a tribute from the Minister of Supply. The year closed with output in most sections still on the upgrade. The executive committee met month by month to deal with current and sometimes pressing problems, but it also gave much thought to the lines along which the industry may be expected to develop, and what additional supplies of material, in quantity and kind, will be needed to support future expansion of output. The related problem of making the best possible use of the manpower resources available to the industry was examined and the executive committee acknowledges the valuable advice which it has received from the training and safety committees of the Council.

Joint Iron Council

Many of the policy questions which come before the executive are of equal interest to the producers of foundry pig-irons, and the facility for direct consultation or combined action through the medium of the executive committee of the Joint Iron Council is increasingly valued by both partners, particularly in matters which may require representations to be made to Government departments, the Iron and Steel Board or the nationalized industries. The executive records with pleasure the re-election of the chairman of the Council (Mr. N. P. Newman) as president of the Joint Iron Council in September, 1955.

The convention of the Joint Iron Council was held in London on November 1, 1955. The eleventh annual report, which reviewed activities over the 12 months ended June 30, had been sent to all member-firms and was formally adopted at the business meeting. The report referred to trade conditions in 1954-55; the estimates of the future production of iron castings and the future pig-iron requirements of the United Kingdom iron foundries prepared by the JIC at the request of the Iron and Steel Board; the revision of the Scrap Control Order; the rising cost and future supplies of coal and coke; the action which had been taken by the JIC in respect of the Government's Clean Air Bill; the work of the CFA in the field of health and safety and in training; the support given to the research and development work undertaken by the British Cast Iron Research Association and the Institute of British Foundrymen; objections lodged against the British Transport Commission's proposed rail charges scheme; and the JIC's submissions to the Minister of Housing opposing the abolition of industrial derating. Finally the report dealt with the arrangements which had been adopted to increase the funds available for research, education and other activities of the JIC.

The afternoon session of the convention was devoted to an account of the work and services of the British Cast Iron Research Association. The evening banquet at the Dorchester Hotel, attended by representatives of member-firms and many distinguished guests, numbering together approximately 500, was honoured by the presence of the President of the Board of Trade (the Rt. Hon. Peter Thorneycroft). His acceptance of the invitation to be the principal guest was particularly welcomed, as a few months earlier he had assumed the Ministerial responsibility for the iron and steel industry which had previously attached to the Minister of Supply.

Iron and Steel Board

During the year the executive committee assisted the Joint Iron Council in preparing two reports for submission to the Iron and Steel Board. The first report —mentioned briefly in the annual report last year— surveyed the factors influencing the future production of iron castings. It embodied a forecast of the total production in 1960, based on certain stated assumptions; later the forecast was revised to a higher level, and an annual output of at least 4¼ million tons is foreseen. Since then the Iron and Steel Board has asked for the estimate of iron castings production to be extended to 1962, and the Joint Iron Council is preparing a statement on this subject which in due course will be submitted to the executive committee for comment. The second report dealt with the pig-iron requirements of United Kingdom iron foundries in 1960, and envisaged a substantial additional requirement in 1960, amounting to some 420,000 tons, of which three-quarters would be for low-phosphorus and hematite grades.

In February, 1955, the Board published a report on the development of the iron and steel industry from 1953 to 1958, in the course of which it was stated that it would be necessary to consider how far the present facilities for the production of hematite and foundry pig-irons were satisfactory. This question was made the subject of a special survey, and the conclusions are the subject of discussion between the Board and the Council of Iron Producers. Throughout the year under review the chairman and other members of the executive committee joined in the discussions which are held at quarterly intervals between the representatives of the JIC and the permanent members of the Board. Matters considered at these meetings included the question of the possible existence of practices that might be regarded as restrictive, and the level of the import tariff on iron castings. After discussions in the Council, representatives advised the Board that the member associations would prefer to communicate with the Board directly on both these subjects, and this was done.

Output

Output for the year was an all-time record for the industry at 3,925,066 tons, an increase of 4.9 per cent. over 1954. The most rapidly expanding sections were automobile (+17.6 per cent.) and engineering (+7.7 per cent.). Railway castings output decreased by 10.4 per cent. compared with 1954, as the result of lower production of castings for the permanent way.

Table I shows how the total output of iron castings was made up in each quarter of 1955. A constantly

growing proportion of total output has consisted of automobile castings, and ingot moulds also rose sharply in the second half of the year.

TABLE I.—*Percentage of Iron Castings Production during* 1955

—	First quarter.	Second quarter.	Third quarter.	Fourth quarter.
Automobile (including tractor)	13.3	13.7	13.9	14.0
Engineering and jobbing	36.6	37.2	37.2	36.7
Building and domestic	15.0	14.9	14.4	14.6
Pipes	18.5	18.0	17.4	17.6
Ingot moulds	9.2	9.2	9.9	10.3
Railway equipment ..	7.4	7.0	7.2	6.8
TOTAL	100.0	100.0	100.0	100.0
Malleable iron (as a percentage of total)	4.1	4.2	4.1	4.3

Raw Materials

Pig-iron.

The unprecedented rate of castings production brought a correspondingly greater demand for raw materials, but much of the increased requirement for pig-iron was for the lower phosphorus grades. The shortage of this material intensified the demand for the hematite and refined irons and for steel scrap. Ironfounders experienced difficulty throughout the year in obtaining extra deliveries of hematite, for the supply position was restricted first by furnace difficulties and then by the effects of the railway strike in the early summer. The output of high-phosphorus pig-iron was adequate to meet the heavier demands from the foundries. The quantity of pig-iron charged by iron foundries in 1955 was 2,477,928 tons (compared with 2,356,925 tons in 1954), and receipts amounted to 2,542,909 tons (compared with 2,356,145 tons in 1954). Stocks at foundries at the end of 1955 were at a level equivalent to 6.7 weeks' consumption, compared with 5.6 weeks' consumption a year earlier.

Iron and Steel Scrap.

During the year the suggestion that iron and steel scrap prices should be freed from controlled maxima was revived, and after a careful analysis of all the factors the executive again decided to support the continuance of control. It was clear at the start of the year that the existing price differentials (which had been distorted by successive flat-rate increases in the post-war years) were diverting scrap unduly from some areas at the expense of local foundry consumers. The Council was represented on a small working party set up by the Ministry of Supply to review the Control Order and advise the Minister. The price changes recommended by the working party were approved in principle by the executive committee, and the amending Order came into force in May. This Order was amended in June to take into account the increases in railway freight charges which were authorized shortly after the issue of the Order. The Minister agreed to adopt a suggestion from the executive committee that the results of the operation of the Order should be reviewed after six months. This was done; it was considered that the price revisions had corrected the disparities and generally improved the fair distribution of scrap supplies.

Bought receipts of iron and steel scrap by iron foundries in 1955 totalled 1,313,836 tons (compared with 1,198,575 tons in 1954). The total amount of scrap charged (including "own arisings") was 3,136,657 tons, compared with 2,962,752 tons in 1954. The proportion of scrap in the total metal charge was little changed at 55.8 per cent. in 1955 compared with 55.7 per cent. in 1954. Stocks of scrap at iron foundries at the end of 1955 were equivalent to 7.8 weeks' consumption compared with 6.7 weeks' consumption a year earlier.

Coke.

No individual shortages of foundry coke were reported to the executive committee during the year, although many foundries would have preferred to use larger quantities of certain of the well-known brands, had these been obtainable. Complaints regarding quality were voiced towards the year end, particularly in the North, but the troubles were neither so persistent nor widespread as to call for an investigation by the national bodies. The executive committee has continued to exchange information with the British Coking Industry Association, which had been informed of the latest assessment of castings production up to the year 1960. The committee understands that the estimate will be taken into account when future coke-oven capacity is planned. In this connection the executive notes that the National Coal Board has revised its "Plan for Coal" and the details in respect of coking-coal supplies will be awaited with interest. Foundry-coke prices were increased in June in consequence of a fresh increase in the price of coal. Foundries producing 89.3 per cent. of United Kingdom iron castings output in 1955 consumed 1,009,420 tons of coke during the year, excluding breeze. This total is not comparable with figures for earlier years, which were less reliable.

Statistics

On many statistical matters the CFA staff maintained close contact with the Iron and Steel Board, which is responsible for the collection of the bulk of the industry's statistics. The lack of statistics on low-manganese hematite pig-iron was keenly felt by the malleable section when a shortage of supplies was experienced earlier in the year. At the request of the committee and with the support of malleable founders, the Iron and Steel Board agreed to issue a special questionnaire to obtain reliable information on consumption and stocks.

Census of Production.

The executive welcomed the Board of Trade's decision that the next full Census of Production, which was due in 1957, would be postponed until 1958. Since 1948 these full Censuses had been taken at three-year intervals, and the change represents an extension to four years. The committee on the Censuses of Production and Distribution recently suggested that a five-year basis might be possible when sufficient sampling experience had been accumulated. The report on the ironfounding Census taken in 1951 was published at the year-end and the conclusions were summarized in a *CFA Bulletin.*

The railway strike which took place in May and June was found, after the event, to have had very little effect on the output of iron castings, although there was some dislocation of pig-iron production. During the period of the strike, however, there was a general drain on stocks of materials at foundries and a desperate position might have developed had the strike been prolonged by even a few days.

Transport

The Railway Merchandise Charges Scheme lodged by the British Transport Commission with the Transport Tribunal in March, 1955, was examined by the transport committee, which recommended the Council

to make objections against certain of the proposals—notably the system of maximum charges under which the Commission would be able to increase the particular rates substantially without the trader having the right to appeal. After further consultation, an objection was lodged by the Joint Iron Council, which fully supported the argument already prepared by the British Iron and Steel Federation. At the close of the year the Transport Tribunal still had the scheme under consideration and had not called for evidence from the objectors. At the year-end the executive learned that the Ministry of Transport proposed to amend the law dealing with the transport by road of abnormal indivisible loads. Member-firms concerned with the manufacture of outsize castings were consulted, and they were unanimous in advising the Council to oppose the additional restrictions which the Minister had in mind. With the support of the executive, this action has been taken.

Costing

The articles entitled the "Elements of Foundry Costing," which had been published at regular intervals since 1953, were completed with the twelfth and last instalment in October. The articles have been particularly appreciated by the small and medium-sized firms in the industry, and many requests for extra copies were received, followed in some cases by a request for the CFA's standard work, "Cost Ascertainment Methods for the Ironfounding Industry based on Uniform Principles." The latter is now out of print, and the executive committee will shortly consider whether one or both of the works should be reprinted.

Import Duty on Castings

In preparation for negotiations under the General Agreement on Tariffs and Trade, due to start in January, 1956, the Board of Trade asked the Council, through the Iron and Steel Board, for its views on the possibility of a reduction in the United Kingdom tariffs on castings. This request was referred to the member associations, and those concerned with special types of castings decided to hold independent consultations with the Board of Trade and the Iron and Steel Board. In the case of iron castings covered by the general tariff heading, four associations held a joint discussion with the two Boards. The associations were unanimously opposed to a reduction in the rate of duty, and subsequently the CFA acted in a co-ordinating capacity and in a written submission to the Board of Trade amplified the arguments which had been advanced in support of the present rate of duty being continued.

Training, Education and Recruitment

The executive committee has noted with satisfaction the progress of the work undertaken by the recruitment, training and education committee of the Council. The committee is assisted by the Council's training officer who is in close touch with a growing number of member-firms and with the colleges and other training establishments that serve the industry. During the year a start was made on the provision of a training course for the ironfoundry supervisor. The committee had taken the view that progress in every field of foundry operations is dependent to some extent on active and enlightened supervision. The future staffing of the foundry at supervisory levels is a matter for long-term planning, but as an immediate step the committee has inaugurated a residential course of one week's duration with the object of relating such subjects as industrial law and human relations, costing and work-study to the day-to-day problems which confront the foreman in doing his job. An experimental course was held in April, and as a result of the experience so gained, the first regular course was held in September, 1955, and the second arranged for January, 1956. The courses took place at the hostel of the National Foundry College, near Wolverhampton, during the College vacations, and with the co-operation of the Governors the Council proposes to continue this arrangement. All the available places were filled and the value of the course was warmly endorsed by the companies who have sent men. Valuable experience was gained on which to base further developments in supervisory training as the needs of the industry become apparent.

The committee wishes to extend its thanks to the companies who allowed members of their staff to participate in the experimental course, and to the members of Council, directors, foundry managers and specialists who generously assisted in the conduct of the courses. The committee has issued to member-firms for comment "An outline of Training for Apprentice Moulders". This report includes a recommended syllabus of practical training, and the committee hopes in due course to embody it in a comprehensive scheme of training suitable for national adoption. This work is being undertaken with a view both to improving recruitment and making more systematic the training of craftsmen.

The Council receives a grant from Conditional Aid funds for the promotion of training in the ironfounding industry, and the advice of the training officer is freely available to any firm that wishes to consult him. The committee has revised and re-issued the Council's recruitment booklet and there has been a steady demand for copies from member-firms and Youth Employment Officers. The staff has kept closely in touch with the Central Youth Employment Executive and several departments of the Ministry of Labour. Advice was given to a number of member-firms regarding the deferment of national service for young craftsmen who had completed their apprenticeship.

National Foundry College.

The National Foundry College, to which the Joint Iron Council makes a substantial annual grant, completed its eighth session in July, 1955. Although there is scope for the industry to make much greater use of the College in training its future technologists and managers, it is evident that the need for the type of higher training provided by the College is becoming more widely recognized. The training officer has been able to act as liaison officer between the industry and the College, and it is envisaged that this function will become increasingly important. The National Foundry College diploma was awarded to 16 students in 1955; a total of 132 students have now attended the diploma course, and 123 National Foundry College diplomas have been awarded to successful students. The number of students attending the College during the session which commenced in September, 1955, is 42. These are made up of 16 students in part I of the course and 26 who entered part II in September.

National Foundry Craft Training Centre.

Recognition of the value of the training for apprentices provided at the National Foundry Craft Training Centre at West Bromwich is demonstrated by the fact that 127 boys attended the courses of four weeks' duration during the year. A further encouraging trend is that a higher proportion of the boys who attended the Centre for the first time in 1953 and 1954 is returning to complete the full programme of four courses. Members of the staff have advised the manage-

ment committee on questions of publicity and liaison with ironfounding companies, and a number of member-firms have been introduced to the Centre for the first time as a result of such contacts.

Conference on Training.

The need for a thorough-going review of the ironfounding industry's manning and staffing needs in the years to come became increasingly evident in the course of 1955. To focus attention on these problems (which, in large measure, are common to the whole of industry), plans have been put in hand for a conference to be held in conjunction with the Joint Iron Council annual convention in 1956. Whilst recognizing that a policy of recruitment and training of personnel can only be finally worked out within each company, the executive committee considers that an exchange of views among the leaders of the industry is highly desirable at this stage, if available manpower resources are to be utilized effectively and a supply of adequately trained staff ensured for the years to come. The conference will be held in London on November 7, 1956.

Teaching Aids.

The Council's instructional films, film strips and wall charts on foundry practice have been supplied to a great many member-firms and technical colleges and schools during the year; and many secondary and other schools have applied to the Council for information on elementary foundry work. The staff assisted the London County Council in starting up a short foundry course for their handicraft teachers.

Health and Safety

The safety committee of the Council has been extremely active, and its membership now includes an industrial medical officer to advise the committee on questions related to health hazards in iron foundries. This side of the committee's work has assumed an increasing importance. Implementation of the Iron and Steel Foundries Regulations, 1953, brought to light many problems. Many people engaged in the industry have criticized the existing types of eye protectors as unsuitable for men handling molten metal, and valuable information on this subject was received from member-firms through a questionnaire prepared by the committee. The replies confirmed that there was no universally satisfactory design available. The committee's views were communicated to Her Majesty's Chief Inspector of Factories, who thereafter set up a joint advisory committee to investigate the design of eye protectors. The Council is represented on this committee. Resulting from a request from the Joint Standing Committee on Conditions in Ironfoundries, the safety committee also considered the practicability of fitting screens in the fettling department to afford eye protection to men who might momentarily remove their goggles and be exposed to particles of metal flying from the tools operated by adjacent workmates.

With the impending introduction (on January 1, 1956) of regulation 7 dealing with the suppression and exhaust of dust fumes, the safety committee has followed with close interest the work of the foundry atmospheres committee of the British Cast Iron Research Association. The Association held a successful conference on the subject of foundry ventilation and dust control in April, 1955. Practical solutions to many of the problems into which research has been made have not yet been found. The staff received many requests from member-firms for information relating to bathing facilities and clothing accommodation, which it was laid down should become statutory requirements on January 1, 1956. In anticipation of the introduction of the regulation (No. 9), the employers' negotiating organizations and the trades unions signed an agreement covering the supply of bath towels to workpeople: the terms of this agreement have been printed in the CFA *General Bulletin* (No. 100). The safety committee was consulted throughout the discussions.

The chairman of the committee (Mr. Colin Gresty) was asked to deliver a paper on "Safety in the Ironfoundry" to the National Industrial Safety Conference at Scarborough in May, 1955, and by permission of the Royal Society for the Prevention of Accidents the Council reprinted the paper and distributed copies throughout the industry. The committee arranged a half-day conference on "Safety in Ironfoundries" in Birmingham in July, in conjunction with a safety exhibition organized by the Birmingham and District Industrial Safety Group. The conference was attended by over 80 representatives from local foundries. Both directly and through its representatives on the Joint Standing Committee on Conditions in Ironfoundries the Council has collaborated with the Factory Department and with other organizations which are concerned with health and safety in the ironfounding industry. The Safety Centre of the Factory Department held an exhibition in the summer to illustrate some of the requirements of the Iron and Steel Foundries Regulations, and with the co-operation of member firms the Council was able to provide a number of exhibits.

Industrial Health Advisory Committee.

Late in 1954 the Minister of Labour set up a standing Industrial Health Advisory Committee to assist him to ascertain where industrial health services most needed to be extended and to promote surveys and field investigations to determine the need for preventive measures of research. The Committee held its first meeting in March, 1955. At later meetings it agreed upon certain lines of action to be pursued by the Ministry of Labour in relation to major health hazards such as dust, fume and dermatitis.

In December, 1955, the Ministry of Labour asked the Council to comment on the proposal before the Advisory Committee that a health survey should be undertaken in the ironfounding industry. The executive informed the Ministry that such a survey would not be welcomed in the industry because it had received a great deal of attention of this kind in recent years and because employers were fully occupied in implementing the Iron and Steel Foundries Regulations, 1953. Later the Ministry informed the Council that the Minister had decided to select another industry for the survey. The first industrial health survey by the Committee was started in October, 1955, in Halifax. The survey is being carried out by Factory Inspectors and is expected to occupy six months. It will include the iron foundries situated in Halifax.

Air Pollution

A Private Member's "Clean Air Bill" was introduced in the House of Commons early in 1955, and was withdrawn after the Government had undertaken to introduce a Bill to implement the recommendations of the Beaver Committee. In the belief that ill-considered action in the political field might impose on the industry inappropriate or impracticable methods of control, the chairman and other representatives of the industry met officials of the Ministry of Housing and Local Government to emphasize the wish of ironfounders to be placed under the supervision of a central inspectorate rather than under local authorities. The Minister was unable to modify his Bill to concede this point, and the executive has since consulted with

the JIC and other bodies to determine what further steps can be taken.

Affiliated Technical Organizations

British Cast Iron Research Association.

The executive committee has again collaborated with the British Cast Iron Research Association in matters of common interest and acknowledges the assistance received from the director and technical staff of the Association. The Association's operational research team had completed 676 visits to iron foundries by the end of 1955. The work of the Foundry Atmospheres Committee provided much of the subject matter of the Association's highly successful conference on "Foundry Ventilation and Dust Control" at Harrogate in April, and the printed report of the proceedings which is to be published should form a valuable work of reference.

Institute of British Foundrymen

The Institute of British Foundrymen was responsible for organizing the International Foundry Congress held in London in June, 1955, and the executive committee must congratulate the Institute upon the excellence of the arrangements. The Technical Council of the Institute has continued to direct research into some 20 projects during the year. Technical sub-committees were formed to deal with terms and definitions in the foundry industry and data on cast iron.

Three sub-committees brought their work to fruition, the reports of two—on internal stress and receivers—will be presented to the Institute's conference in 1956, and the third committee's work will be included in the "Atlas of Typical Microstructures," which the Institute hopes to publish shortly. In its annual report the Technical Council paid tribute to the Joint Iron Council for the substantial help which it provided to maintain the Technical Council's work. The Institute's foundry foremen's training course, which is now a firmly established event, was held at Harrogate with an attendance of 160.

Relations with Other Bodies

The Council is represented on the Grand Council of the Federation of British Industries and the executive of the National Union of Manufacturers and has collaborated with both these organizations in matters of broad concern to industry—for example, taxation, planning, atmospheric pollution and transport. The Council has also collaborated with the Engineering and Allied Employers' National Federation, the National Light Castings Ironfounders' Federation and the British Steel Founders' Association in various matters concerned with health and safety. The Council has given active support to several of the activities of the Royal Society for the Prevention of Accidents and the Industrial Welfare Society.

Members of the executive committee were present when the International Committee on Cast Iron was entertained by the Joint Iron Council during the inaugural meeting in London in September. The meeting was convened by the British Standards Institution for the International Standards Organization, and under the chairmanship of the director of the British Cast Iron Research Association, the meeting was mainly concerned with establishing an agreed international method for defining the quality of grey cast-iron. The Council was invited to make an official visit to the Foundry Trades' Exhibition at Olympia, London, in September.

The executive committee has worked steadily on a revision of the constitution of the Council which would give effect to recommendations submitted to the Council by the member associations. A printed draft was sent to the associations for comment in December and considered by the Council in January, 1956. The majority of the revised clauses in the draft were accepted but common agreement has not been reached on questions of membership and voting rights, and the Council will give further consideration to these sections at the annual meeting in April, 1956.

Membership of Executive Committee.

At the annual meeting in 1955, Mr. A. D. Mackenzie and Mr. J. W. Gardom retired from the executive committee on completion of their terms of office. Both gentlemen continue to serve on the Council. In September the death of Mr. Arthur Watson deprived the committee of an original member and a great friend. In respect to his memory his place was not immediately filled, but Mr. S. N. Turner was elected to the vacancy in January, 1956. Also in September, one of the vice-chairmen, Mr. P. Leonard Gould, resigned consequent on business changes. He had been a member of the Council and the executive for many years, and the vice-chairman representing the engineering section of the industry since 1953. The Council decided to make a presentation in January, 1956, to Mr. Gould. Mr. Malcolm J. Glenny, a member of the executive, was elected a vice-chairman in succession to Mr. Gould.

Institute of Physics

Non-destructive Testing Group's Conference

The Institute of Physics is holding its 1956 summer conference at Bristol, from July 11 to 14, in the H. H. Wills Physical Laboratory, with an introductory session at Wills Hall. The conference is open to all interested, whether or not they are members of the Group, and a fee of one guinea will be charged for those attending who are not members of the Institute. The guest speaker at the introductory session on July 14 at 8.15 p.m. will be Dr. S. G. Hooker, O.B.E. (director and chief engineer, Bristol Aero-Engines, Limited), and he will comment on the significance of non-destructive testing in the aircraft industry. Dr. E. G. Stanford, M.SC., A.INST.P. (Aluminium Laboratories, Limited), will discuss the programme in the light of the widened scope of the Group's activities. A works visit has been arranged for Friday, July 13, commencing at 1.45 p.m., when a party will be conducted through various departments of Bristol Aircraft, Limited, and Bristol Aero-Engines, Limited. Those wishing to attend the conference should apply for full details and enrolment forms to the deputy secretary, Institute of Physics, 47, Belgrave Square, London, S.W.1, not later than June 25.

Bibliography on the CO_2 Process

The Science and Commerce Department of the Sheffield City Libraries have issued, as No. 62 in their series of Research Bibliographies, a select bibliography on the CO_2 Process. Already, the impact of the Process is said to have been as great on the foundry industry as shell moulding was a few years ago. Literature on the subject is still restricted to pamphlets and articles in the technical Press, but those who wish to know details should find this publication with its 65 references (beginning with British Patent 15,619 in 1898!) a useful guide. Copies may be obtained free upon application to The City Librarian, Central Library, Surrey Street, Sheffield, 1.

Company News

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—The company has discontinued tentative discussions which were being carried on with another group and could possibly have resulted in a bid for Gas Purification's ordinary shares.

BRIGHTSIDE FOUNDRY & ENGINEERING COMPANY, LIMITED—It is proposed to form a new company to take over the activities of the foundry and engineering divisions. The new company will, in order to preserve goodwill, take over the name of the existing company, which in turn will change its name to Brightside Engineering Holdings, Limited.

PERMUTIT COMPANY, LIMITED, makers of water filtration and purification plant, etc., of London, W.4—The new factory at Ealing is expected to be operating by July. The estimated total cost should not exceed £250,000 and contracts amount to £180,000. CIC permission has been secured for the issue of ordinary 5s. shares at about 10s. per share. Full details will be posted as soon as they are available.

G. & J. WEIR, LIMITED—The group is aiming at a slightly larger output this year. Unless unexpected difficulties emerge, the 1956 output will be comparable with 1954 and 1955, says Mr. J. K. Weir, the chairman, in his statement with the full accounts. Current inquiries are at a healthy level and he feels that the order position should show still further improvement in the next few months. The outlook for the group's engineering companies seems definitely brighter, he declares.

GIBBONS (DUDLEY), LIMITED, makers of refractories, etc.—The company is paying a final dividend of 7½ per cent., making 12 per cent. for 1955, an effective increase of 2 per cent. over the 10 per cent. equivalent of 1954, when there was a 150 per cent. scrip issue between interim and final dividends. Col. W. E. Gibbons, chairman, reports full order-books in almost every department, and although there is a shortage of steel, he sees no reason why 1956 should not be a good year or why its dividends should be any less than in 1955.

W. H. ALLEN, SONS & COMPANY, LIMITED, engineers, of Bedford—An issue of £800,000 5¼ per cent. first mortgage debenture stock is being made to the Prudential Assurance Company, Limited, at 98 per cent. The trust deed will authorize the creation of up to a further £200,000 to rank *pari passu*. The money is being raised to finance a development programme. The one-for-one scrip issue, which will capitalize £321,875 from the £717,200 in the reserve for increased cost of replacement of fixed assets and for research and £700,000 from the £800,000 in general reserve, will be made to holders at May 24. Renounceable allotment letters will be posted on June 6.

LANCASHIRE DYNAMO HOLDINGS, LIMITED—The year 1955 saw continuous progress in both orders and sales generally throughout the group and this trend continues to date, reports the chairman, Sir Percy Mills, in his statement with the full accounts. Sir Percy warns holders that 1956 may prove difficult for productive industry, but adds that the need for the group industry's products is "a progressive one" so that the board regards the future confidently. Referring to credit restrictions, the chairman says the group's business growth is necessarily conditioned by resources available for improvement and enlargement of facilities, an aspect that will continue to engage the board's attention.

New Patents

(Copies of complete specifications are obtainable from the Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

746,846. Projectile and Engineering Company Limited, Acre Street, Battersea, London, S.W.6.

A shell-moulding machine having a number of moulding stations and a single oven. The parts are so arranged that the oven can be brought successively into operative relationship with a pattern at each moulding station. The oven is, in fact, mounted on a swinging bracket to enable it to be swung from one moulding station to another.

746,994. Société D'Electro Chimie d'Electrometallurgie et des Acièries Electriques d'Ugine, 10, Rue de General Foy, Paris (Seine), France.

An improvement or modification of the process for reducing the silicon and sulphur content of pig-iron (see patent No. 742,202, FOUNDRY TRADE JOURNAL, January 19, 1956). In oxidizing the silicon, the reducible oxides in the slag are replaced, wholly or in part, by an addition of gaseous oxygen or a gas or gases containing available oxygen.

747,056; 747,057. General Motors Corporation, Grand Boulevard, Detroit, Michigan, USA.

747,056. An aluminium-base alloy suitable for use as a bearing material containing silicon from 0.5 to 9, cadmium from 0.2 to 5, indium from 0.03 to 0.5 per cent., the balance apart from usual impurities being aluminium.

747,057. Similar material, but containing silicon 0.5 to 9, cadmium 0.2 to 5, chromium 0.1 to 0.5 per cent., the balance, apart from impurities, being aluminium.

747,137. Metalgesellschaft Aktiengesellschaft, 45, Bockenheimer Anlage, Frankfurt-on-the-Main, Germany.

A method of producing compound castings between a metal or alloy on which a connecting layer is adapted to be produced by the immersion of the metal or alloy in molten aluminium, and magnesium or magnesium alloys. The workpiece of the basis metal is first provided with a coating by immersion in aluminium or aluminium alloy and then the magnesium or magnesium alloy is poured on to the treated workpiece.

747,209. Kaiser Aluminium and Chemical Corporation, 1924, Broadway, Oakland, California, USA.

A method for production of sodium-aluminium fluoride and a silicon/aluminium alloy. A reaction zone at a temperature of at least 800 deg. C is provided, together with a molten fluoride bath consisting of either or both of sodium fluoride and sodium-aluminium fluoride. The aluminium metal is added to the reaction zone in contact with the bath. Either or both of silicon tetrafluoride or sodium fluorsilicate is continuously added to the mixture with bath and the mixture is vigorously agitated to form sodium aluminium-fluoride and a silicon/aluminium alloy.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

URUGUAY, June 5—Iron and iron pipes, for the Ministerio de Salud Publica. (ESB/12506/56.)

INDIA, June 11—Diesel-driven centrifugal pumps, for the Madras Port Trust. (ESB/12674/56.)

SOUTH AFRICA, June 1—Mobile cranes, for the Stores Department of the South African Railways. (ESB/12414/56.)

Furnace Television Equipment

Scanning Periscope in Use at Barking Power Station

An installation of furnace-scanning periscope coupled with television viewing as applied to boiler firing was recently inspected by the writer at Barking Power Station, near London, by courtesy of Babcock & Wilcox, Limited. Because the principles involved may equally well be applied to foundry and steel-melting furnaces the salient features of the installation are recorded in what follows:—

The observation of furnace conditions, comparatively simple in the case of narrow stoker-fired boilers, has tended to become more and more difficult as the size of the boilers increased. It has never been a simple matter to obtain a good view of a large furnace through a comparatively small inspection door, and a blue glass and a stainless steel mirror have been the combustion engineer's constant companions for a very long time.

The application of closed-circuit television to furnace observation has only recently begun to be seriously considered in this country, although it is possible to obtain a picture of the interior of certain types of furnaces by mounting a suitably protected camera directly on the furnace wall.

The Babcock unit has been developed by the firm in conjunction with the British Iron and Steel Research Association, Marconi's Wireless Telegraph Company, Limited, and the Foster Instrument Company, Limited. The present periscope, which is completely watercooled, with air-blast incorporated to keep fly ash from settling on the lens windows, is mounted, together with its associated television camera, on a carriage which can be advanced into the furnace or retracted by means of a Martonair remote-controlled air cylinder. If applied to a pressure-operated furnace, the nose of the periscope water jacket is fitted with a conical fairing to avoid interference with the flow of air in the air-blast door through which the unit enters. This takes the form of a circular opening with gas-tight flaps that are pushed open by the nose of the periscope as it advances. At the same time, high-pressure air is automatically admitted to a ring of nozzles which converge on the opening surrounding the doors. The velocity of these air jets is sufficient to induce air into the furnace and form a curtain which prevents any tendency towards the emission of gas or flame.

Optical System

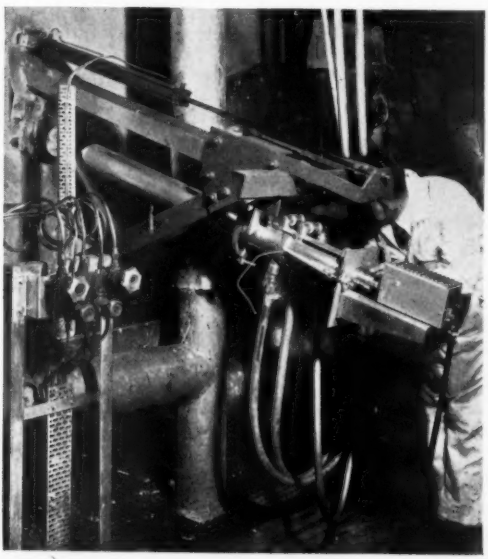
The fundamental requirements of the optical system were, as have already been stated, a wide angle of vision without exposed lens surfaces. A periscope for furnace observation which answers some of these requirements was used some years ago (1949) by the British Coal Utilisation Research Association. Working from this, Mr. Burns, of the British Iron and Steel Research Association developed a panoramic periscope. In this, the main objective lens can be located some distance away from the furnace end of the periscope. The actual observation is carried out by the use of twin entrance apertures with lenses and prisms so arranged that the two fields of view are combined in panoramic form with a dividing line at the centre of the picture. A field of 90 deg. in one plane and 45 deg. in the other plane can quite easily be resolved, thus permitting the observation of a complete burner wall from a position above the burners. A comprehensive view has many advantages over the limited view obtained from any one inspection door.

Television System

The television apparatus is of the industrial type as developed by Marconi's Wireless Telegraph Company, Limited. The camera is noteworthy for its very small dimensions, since it employs a miniature "Vidicon" pick-up tube which is only 1 in. dia. Associated with the camera are the usual control unit and power pack and one or more viewing tubes or monitors.

The scheme as installed utilizes the normal complement of safety interlocks to ensure against failure of cooling water or blast air and to ensure that both are available before the unit is advanced into the furnace. In addition, what might be termed "economy" controls have been fitted. It will readily be realized that there is little need for

FIG. 1.—*Periscope, with T.V. camera attachment, about to enter the furnace.*



Furnace Television Equipment

continuous observations of a normal furnace when operating under stable conditions. The need for maximum visibility is during lighting-up, and in emergencies. The boiler control panel is fitted with a "turn-down" control so that the pick-up tube normally operates at considerably less than maximum brightness. A photo-electric cell is permanently arranged at another specially chosen point in the furnace to keep continuous watch and should the furnace brightness be reduced below normal, an alarm is sounded on the control panel. At the same time the periscope is automatically advanced into the furnace and a picture obtained on T.V. screen. The operator would answer the audible alarm and, at the same time, immediately turn the camera output up to the maximum. The photo-cell could, of course, be arranged to do this automatically but, since the object of the alarm is to ensure that the operator immediately goes to the monitor screen to observe conditions, there seems little point in this additional refinement.

Evaluation of Casting Processes

What follows is a further contribution to the written discussion on the American exchange paper "Evaluation of Castings Processes,"* by Mr. Hiram Brown at the International Foundry Congress in London:—

DR. WITTMOSER writes: Some of the contributors to the discussion seem to have regarded Mr. Brown's remarks as a low evaluation of the so-called "precision-casting methods" (lost-wax process and shell moulding) which have been developed during recent years. Mr. Brown has only drawn attention to the limits which apply to the various casting methods described summarily as "precision casting." The essential point in Mr. Brown's arguments seems to be his statement that the various precision-casting methods do not achieve maximum surface quality and dimensional accuracy which may be expected from their description.

No doubt, the "ideal" precision casting is the die-casting in its well-known form, but in many cases (particularly with the high-smelting-point alloys) die-casting could only be applied with difficulty or uneconomically, and this led to the development of casting processes which do not attain the accuracy of the die-casting but do achieve a degree of dimensional precision and surface quality far superior to the usual sand casting. By these means the accuracy obtainable can be graduated from the die-casting down to the sand casting, investment casting and shell moulding forming intermediate steps in this range. By taking this point of view the evaluation of the various casting methods will place them each in its proper category and members should be grateful to Mr. Brown for having so ably explained the matter.

* Printed in the JOURNAL, July 28 and September 8 (discussion).

British Industries Fair, 1957

The British Industries Fair to be held at Castle Bromwich, near Birmingham, from May 6 to 17 next year will, it is claimed, be the largest national exhibition to be held under one roof. This year, and for many years previous, only the engineering sections of the Fair were held at Castle Bromwich, textiles, chemicals, etc., being held at Olympia and Earls Court, London. Next year, the whole of the Fair will be housed at Castle Bromwich and it is expected the pressure of demand for available space will be considerable.

Foundry firms were as usual well represented at this year's Fair, indeed some of the most prominent and largest positions at Castle Bromwich have habitually been taken by founders or foundry-equipment manufacturers and many of these have intimated that they will continue to show in 1957. Certain it is that in an exhibition with such a wide coverage of manufacturing industry, the stand-holders no less than the visitors have a unique opportunity of culling ideas from trades remote from their own—for example, a device for spraying paint may prove germane for applying refractories to furnaces or dressings to moulds.

A new arrangement next year will make Commonwealth manufacturers eligible as exhibitors. Castle Bromwich is easily reached from all parts of the country by air, rail and road; it has parking for over 5,000 cars and coaches and adequate accommodation for trade buyers and exhibitors. Direct air services from the Continent operate to the city's airport at Elmdon, which will be augmented. The exhibition hall is all on one floor, which is a great advantage. The policy of open and semi-open stands will be continued, because of the increased display value and low costs of construction. Fair publicity will aim at keeping overseas and home-trade buyers fully informed about new developments, processes and products, so that they will be able to decide in advance what is of interest in their line of business.

Bessemer Memorial Display

A new ferrous metallurgical display in the Science Museum, South Kensington, to commemorate Sir Henry Bessemer is to be created by the British Iron and Steel Federation, in co-operation with the museum authorities. For this purpose the sum of £50,000 has been allocated. It is hoped the gallery will be completed within three years. Preliminary plans for this exposition are being prepared in consultation with the museum authorities.

The present space of the iron and steel section is 2,800 sq. ft., but even this is partly intermingled with the exhibits of the non-ferrous metallurgical industries. As part of their general scheme of reorganization, the museum authorities hope to make available 3,500-4,000 sq. ft. in a separate, self-contained section.

The Minister of Education has expressed his gratitude to the industry for showing its interest in the museum in so practical a way.

Bessemer was born on January 19, 1813, and died on March 15, 1898. It is just 100 years since he delivered his now famous paper at a meeting of the British Association and the centenary is being celebrated by papers to be given to many societies throughout the world.

STANTON IRONWORKS COMPANY, LIMITED, were visited by members of the Nottingham City Business Club on May 17.

Notes from the Branches

Lancashire

The annual general meeting of the Lancashire branch of the Institute of British Foundrymen was held on April 14, with Mr. A. Kirkham, B.Sc., presiding, the attendance being a record for any meeting of this kind. After the "minutes" Mr. F. W. Nield, the secretary, presented his report as follows:—

Secretary's Report

The past year has been an outstanding one for the Lancashire branch, both from an historical point of view and from its national and international activities. From the historical aspect the branch, which was founded in Manchester in 1905, and was the first to be formed in the Institute, celebrated its Golden Jubilee this year. This is an honour for which all Lancashire members can feel justly proud. The Jubilee dinner and smoking concert held at the Midland Hotel, Manchester, on November 4, 1955, was a memorable celebration for this occasion, and some 80 or more members, old members and guests, attended. The president of the Institute, Dr. A. B. Everest; the senior and junior vice-presidents (Mr. H. J. V. Williams and Mr. J. Blakiston), Mr. G. Lambert (national secretary) and Mr. A. R. Parkes (London branch secretary), were among the many guests. Some "old timers" present were Mr. J. Hogg, Mr. W. H. Meadowcroft, Mr. A. Key, Mr. W. Rawlinson and Mr. Barron. Prior to the dinner, a Press conference was arranged, at which the aims and work of the Institute, the history of the branch and the attention given to education, were among topics explained by the branch president, Mr. A. Kirkham.

In the international field, the branch entertained 65 overseas visitors to dinner on July 1, 1955, at the Midland Hotel, Manchester. The event was the culmination of two days of works visits in the area by delegates who had attended the International Congress in London the previous week. The foundries visited were Metropolitan-Vickers Electrical Company, Limited, Manchester; Joseph Berry, Limited, Swinton; National Gas and Oil Engine Company, Limited, of Ashton-under-Lyne; and Mather & Platt, Limited, Manchester. The branch is greatly indebted to the directors of these four companies who allowed these visits to take place and also for their hospitality.

Branch Meeting

The branch's own works visits were to the Rotherham foundries of Gummers, Limited, and Guest & Chrimes, and to David Brown Jackson & Company, Salford. In these three visits the non-ferrous, grey iron and steel foundry members were fully catered for.

Attendance figures at lectures during the past session have shown a slight increase and this, it is felt, is a true reflection on the high standard and interesting variety of papers that have been presented. The branch Council's decision to have lectures at the Midland Hotel instead of the Engineers' Club has, it is hoped, met with everyone's approval. During the past session, six papers have been presented before the branch and these were well delivered and the discussion was on a high level.

Membership goes from strength to strength and during the past session the following new members have been admitted:—23 associate members and 12 associates.

Efforts have also been made to try to form a new section in the Stoke-on-Trent area. Mr. G. Lambert and the branch president have supported this interest by arranging four lectures at Stoke-on-Trent. These lectures were well attended and it is hoped that the good work already put in will bear fruit and that next year will see a thriving section in the Potteries.

The "John Wilkinson Short Paper Competition" this year has shown a marked improvement in the number of entrants as against the previous year. Although this improvement is very encouraging and the standard of the papers has been much higher, the branch Council are still not satisfied with the interest shown by apprentices and appeal to all members to encourage at least one apprentice in their foundry to take part in this competition. Mr. Stanley Brooks, to whom the branch is greatly indebted, has announced his retirement as organizer of this competition, and Mr. Eddie Beech has taken over the duties.

Annual Dinner

The annual dinner/dance, held in January, as was expected during this Golden Jubilee year, had a record attendance. Its success must be attributed to the social secretary, Mr. W. E. Spenceley, and the support given by the social committee. Among those present were Dr. A. B. Everest; Mr. H. J. V. Williams; Mr. J. Blakiston; Mr. E. Longden; Mr. John Bell; Mr. R. L. Handley; Mr. George Lambert; and Mr. Bernard Gale, president of the Burnley section.

The Burnley section has once again had a very good session and Mr. Bernard Gale and his Council are to be congratulated on the high standard and excellent variety of papers presented to their section.

This report would not be complete if reference were not made to the excellent work of the president. There is no branch in the Institute which could have wished for a more worthy president than Mr. Kirkham. The time and energy spent on his duties could not be surpassed. During his very busy year of office, he has always fulfilled his responsibilities and has put the interests of the branch and Institute first.

The adoption of the report was proposed by Mr. Henley and seconded by Mr. C. R. Van der Ben. Mr. Henley speaking of the hard work done by Mr. Nield, calling for initiative, energy and tact. After the auditor's report and the financial statement had been approved, Mr. W. N. Cook proposed a vote of thanks to the retiring officers of the branch and spoke of the enormous amount of work behind the scenes which had been done by Mr. Kirkham, Mr. Booth, Mr. Spenceley (who had served as deputy branch representative of the Technical Council) and Mr. Cameron. Mr. Swinglehurst seconded the resolution and said that it had been an education to him as a "new boy" serving on the branch Council, to see just how the branch was run.

Election of Officers

Then followed the election of officers for the 1956/7 session at which the following were chosen: As president, Mr. Spenceley; as senior vice-president, Mr. E. Beech, and as junior vice-president, Mr. H. Booth; as honorary secretary, Mr. F. W. Nield; honorary treasurer, Mr. R. Yeoman; and as representatives to general Council of the Institute: Mr. A. Kirkham, Mr. C. R. Van der Ben, Mr. H. Haynes, and Mr. E. Jackson. The three members elected to the branch Council for three years were Mr. H. Buckley, Mr. R. Masterton, and Mr. C. M. G. Wallwork. Mr. C. R. Van der Ben was chosen as representative of the branch on the Technical Council, with Mr. G. R. Southern, his deputy.

Notes from the Branches

John Wilkinson Competition

Mr. Beech expressed appreciation to the foundry executives and managers for the interest taken with the John Wilkinson Competition. Regarding entrants, it was quality which was wanted rather than numbers, although numbers were important. This year not only had there been a big increase in the number of entrants but the standard of papers had been higher, and he expressed thanks also to Mr. Kirkham, Mr. Jackson and Mr. Walker for all their help. The winner of the first prize, who received a cheque for £8 8s. 0d. and the John Wilkinson medal, was apprentice moulder, Mr. Edward G. Hughes, of Vickers-Armstrongs, Limited, Barrow-in-Furness. The second prizewinner was Mr. F. W. Hall, of Metropolitan-Vickers, Limited, Manchester, who received eight guineas, and the third prize of five guineas was gained by Mr. Fred Gartland, of Distington Engineering Company, Limited. Afterwards Mr. Hughes, who is now in the Forces, read his prizewinning paper.

Law Cases

Pneumoconiosis

In a judgment issued at the Court of Session on May 1, Lord Strachan commented on the striking increase in the number of steelworkers known to be suffering from pneumoconiosis, and he awarded damages totalling £6,742 10s. in a series of actions arising from workmen having contracted the disease. In one of the longest judgments issued in the court for many years, he traced the history of the knowledge of the disease, and said that investigations had been conducted by the steel industry and by a committee appointed by the Chief Inspector of Factories. Twelve actions by workmen claiming damages against Wm. Beardmore & Company, Limited, Glasgow, were disposed of. In one case the pursuer has died since the action was raised and his case has been continued. In the other 11 actions, in which damages totalling £47,500 were sought, awards made aggregated £6,742 10s.

In the course of investigations a mobile X-ray unit visited Beardmore's steel foundry at Parkhead Forge. The workers were examined and it was discovered for the first time that some of them were suffering from the disease. Dealing with the cases before him, Lord Strachan said that pneumatic tools were used for rough dressing and finishing the castings. It was clear from the evidence that, while all the processes through which the castings went necessarily gave off much dust, the pneumatic tools were much the most dangerous in that the operators were very much more exposed to the very fine particles of dust which caused the disease. On the question of the alleged negligence of the company his lordship had to consider whether the state of knowledge of pneumoconiosis in steel foundries was such that they should reasonably have foreseen the risk of their workmen contracting it. "It seems clear that the company did not appreciate the risk until they became aware of the results of the mass X-ray examinations in 1950."

It was maintained on their behalf, the judge said, that they could not reasonably have foreseen the risk before 1950 because of the absence of knowledge throughout the industry as a whole, and that argument was put forward as a complete answer to all the claims so far as based on Common Law. That contention received much apparent support from the undoubted fact that in 1950-51 a vast amount of information was made available to the industry generally which had previously been known only to the experts. That information was the result of very considerable investigations which had begun about 1943.

No Negligence

The defenders were acquitted of negligence in not issuing Mark IV respirators to their employees in the dressing shop up to the time of the 1944 report. There was evidence that no such respirators were issued until after the result of the mass X-ray in 1950 became known, and for the period after the 1944 report the evidence was conclusively against the defenders. "With the knowledge of the risk to fettlers that must have been brought home to the defenders by the 1944 report, and the further knowledge that it was impracticable to protect them by an exhaust ventilation, it was, in my opinion, the plain duty of the defenders to acquire and issue such respirators and to take reasonable steps to see that they were worn," said Lord Strachan.

Inspection Lamp Accident

Changing a bulb in an inspection lamp without switching off the current, was the cause of a workman being electrocuted, it was stated at a Lichfield inquest on May 1, when a verdict of "accidental death" was returned on W. R. Disney. The coroner, Mr. K. T. Braine-Hartnell, said: "This accident happened because Disney was forgetful. No man in his right senses would have done what he did unless he forgot to switch the current off." Disney was found dead in the foundry of Chamberlin and Hill, Limited, Beacon Street, Lichfield, where he worked. Death was from shock following electrical burns. A Midlands Electricity Board engineer, said the inspection lamp was in perfect order. Sidney Albert Meacham, an employee of the firm, said part of Disney's job was to look inside cupolas for faults with the inspection lamp. Disney was found with one hand inside the lamp, clutching the bulb, which was broken. The coroner said that it appeared Disney had tried to take the bulb out while the current was still on and his fingers had touched the filament.

Goggles Receipt Incorrectly Dated

When a moulder sued his employers at West Bromwich County Court in February for damages as a result of an eye injury he received in May, 1954, the company's defence was that he had failed to use the protective goggles supplied and a list of employees' signatures was produced, said to have been given by the men acknowledging receipt of the goggles on April 29. At the resumed hearing on April 11 at West Bromwich County Court, however, Mr. E. G. H. Beresford, for the company, said that the date was incorrect—the goggles did not arrive at the works until October 28, 1954. The wrong date was due to a typist's error.

The plaintiff, William Holland, of Chapel Street, West Bromwich, claimed damages amounting to £100. He was awarded £10, and was allowed £2 7s. 6d. special damages for one day's loss of work.

FIRTH BROWN TOOLS, LIMITED, have changed the address of their Manchester office to Speedicut House, Royle Street, Fallowfield, Manchester, 14.

LIGHT ALLOY PRODUCTS COMPANY, LIMITED, has had plans prepared for the proposed extension of the foundry in Forge Lane, Minworth, Sutton Coldfield.

Pig-iron and Steel Production

Statistical Summary of March Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table I summarizes activities during the past six months. Table II gives production of steel ingots and castings in March, and Table III, weekly average production of finished steel. Table IV gives the production of pig-iron and ferro-alloys in March, 1956, and furnaces in blast. (All figures weekly averages in thousands of tons.)

TABLE I.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imptd. ore used.	Coke to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	I. & S.	Coal.	Basic materials excl. fuel[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[3]
1953	260	350	506	304	207	237	215	188	17	339	262	962
1954	263	364	498	299	234	238	229	198	7	356	277	931
1955	276	399	529	311	244	246	240	213	29	381	305	1,183
1955—Oct. ..	284	425	532	334	249	257	249	225	34	399	332	1,163
Nov.[4]	285	431	532	331	259	261	253	228	36	409	332	1,154
Dec.	285	435	539	313	268	261	250	208	35	382	320	1,183
1956—Jan.	285	436	537	328	278	270	261	222	38	405	337	1,208
Feb.[4]	285	437	537	315	284	269	263	226	37	418	332	1,220
Mar.[4] ..	285	437	541	346	276	273	262	231	37	426	—	1,251

TABLE II.—*Weekly Average Production of Steel Ingots and Castings in March*, 1956

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derby, Leics., Notts., Northants. and Essex ..	—	4.4	14.0 (basic)	2.2	0.1	19.6	1.1	20.7
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire	1.2	36.9	—	2.5	0.4	39.6	1.4	41.0
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	43.0	—	—	0.1	43.0	0.1	43.1
North-East Coast	0.6	80.4	—	1.4	0.5	80.9	2.0	82.9
Scotland	3.7	44.0	—	2.7	0.5	48.5	2.4	50.9
Staffs., Shrops., Worcs. and Warwick	—	20.0	—	1.3	0.8	20.0	2.1	22.1
S. Wales and Monmouthshire	5.5	86.7	6.6 (basic)	1.1	0.2	99.4	0.7	100.1
Sheffield (incl. small quantity in Manchester) ..	9.0	35.6	—	12.2	0.5	55.2	2.1	57.3
North-West Coast	—	1.9	5.1 (acid)	0.6	0.1	7.6	0.1	7.7
Total	20.0	352.9	25.7	24.0	3.2	413.8	12.0	425.9
February, 1956[4]	21.8	342.8	26.2	23.9	3.1	405.9	11.9	417.8
March, 1955[4]	20.4	324.1	24.9	22.1	3.4	383.4	11.5	394.9

TABLE III.—*Production of New Non-alloy and Alloy Finished Steel.*

Product.	1954.	1955.	1955.	1956.	
			Feb.	Jan.	Feb.[6]
Non-alloy steel:					
Ingots, blooms, billets and slabs[5]	5.1	4.9	5.0	4.8	4.9
Heavy rails ..	9.6	9.4	10.1	9.2	10.3
Sleepers, fishplates and soleplates ..	1.9	2.0	2.5	1.9	2.4
Plates, ¼ in. thick and over ..	47.0	46.1	47.7	50.4	52.2
Other heavy prod.	45.8	47.8	50.9	50.4	50.6
Ferro-concrete bars, etc.	5.9	7.0	6.5	7.7	7.4
Wire rods (incl. coiled rods, etc.)	19.7	22.2	23.5	25.1	25.4
Light rolled prod.	41.2	46.4	48.5	52.4	51.9
Bright steel bars ..	6.3	7.8	7.7	8.9	8.6
Hot-rolled strip ..	21.7	24.1	24.4	26.5	26.9
Cold-rolled strip ..	7.0	8.1	7.8	9.1	8.7
Sheets (incl. coated)	38.8	42.7	44.9	45.5	44.4
Tinplate, terneplate and blackplate ..	16.8	17.0	16.6	17.0	16.9
Tubes and pipes ..	20.9	22.9	22.3	24.3	26.3
Tube, pipe fittgs ..	0.4	0.4	0.4	0.5	0.4
Tyres, wheels and axles	4.7	4.8	5.7	4.4	5.0
Forgings (excl. drop forgings) ..	2.6	2.5	2.7	2.9	2.6
Steel castings ..	4.0	4.2	4.2	4.3	4.7
Tool and magnet steel	0.2	0.3	0.3	0.3	0.4
Total deliveries from U.K. prod.[6] ..	298.7	320.6	331.7	345.6	350.0
Alloy steel	13.2	15.3	15.8	17.3	16.7
Total deliveries ..	311.9	335.9	347.5	362.9	366.7
Add: Imported finished steel ..	5.0	18.8	13.0	30.2	21.5
	316.9	354.7	360.5	393.1	388.2
Deduct: Intra-industry conversion[7] ..	41.5	50.4	48.9	57.1	57.3
Total net deliveries of new material ..	275.4	304.3	311.6	336.0	330.9

TABLE IV.—*Production of Pig-iron and Ferro-alloys during March*, 1956.

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total
Derby, Leics., Notts., Northants and Essex	25	—	20.4	27.1	0.9	—	48.4
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire ..	7	—	20.3	—	—	1.5	21.8
Yorkshire (excl. N.E. Coast and Sheffield) ..							
Lincolnshire ..	10	—	37.7	—	—	—	37.7
North-East Coast	21	4.7	48.3	—	—	1.5	54.5
Scotland	9	0.8	15.8	1.5	—	—	18.1
Staffs., Shrops., Worcs., and Warwick ..	7	—	10.5	1.6	—	—	12.1
S. Wales and Monmouthshire	11	4.5	40.1	—	—	—	44.6
Sheffield	2	—	3.4	—	—	—	3.4
North-West Coast	9	19.6	—	0.2	—	1.6	21.4
Total ..	101	29.6	196.5	30.4	0.9	4.6	262.0
February, 1956[6]	102	30.7	197.9	29.4	1.2	4.1	263.3
March, 1955[4] ..	100	27.1	176.8	31.2	1.4	4.2	240.7

[1] Used in non-food manufacturing industry.
[2] Weekly average of calendar month.
[3] Stocks, mainly ingots and semi-finished, at the end of the years and months shown.
[4] Five weeks, all tables.
[5] Other than for conversion into any other form of finished steel listed.
[6] Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
[7] Material for conversion into other products also listed in this table.

News in Brief

THE INSTITUTION OF CHEMICAL ENGINEERS will hold a symposium on chemical engineering at the University, Birmingham, from Tuesday, April 9, to Thursday, April 11, 1957.

AREA OFFICES of Fielden Electronics, Limited, have been opened at Stockton-on-Tees, Dudley and Cardiff, the Southern Counties and most of East Anglia being covered by the London office.

THE BRITISH STANDARDS INSTITUTION announces the publication of a new standard, BS 2715:1956 for shaft coupling flanges. Copies may be obtained from the Institution's sales branch at 2, Park Street, London, W.1 (price 2s. 6d. each).

IN ORDER to meet the growing demands for complete metallurgical installations, Edwards High Vacuum, Limited, has formed a joint company Efco-Edwards Vacuum Metallurgy, Limited, in equal association with the Electric Furnace Company, Limited.

THE NATIONAL SOCIETY OF MASTER PATTERNMAKERS announces that Mann Judd & Company have resigned as secretaries of the Society, and as from to-day (May 31) all communications should be addressed to the new secretaries—Fisher, Firkins, of 12, Cherry Street, Birmingham.

CONTRACTS valued at £8,500,000 have been obtained by the Gutehoffnungshütte, the German concern, from the Indian Government. The contracts cover the construction of three blast furnaces of 1,000 tons daily output each at Rourkela. It is expected that most of the orders for the steel mills and rolling-mill installation will be placed with Krupp and Demag concerns, which have acted as consulting engineers for the project.

MODERNIZATION of the Singapore gasworks is to be undertaken by Humphreys & Glasgow, Limited, London, S.W.1, under a contract valued at approximately £180,000. Existing carbonizing and water-gas plant is to be replaced by oil-gas and there will thus be a need for only one basic raw material—heavy oil—which will replace the coal, coke, and gas oil now used. Three sets of regenerative plant utilizing the Onia-Gegi catalytic process will be built.

ABOUT 200 EMPLOYEES of Herbert Morris, Limited, Loughborough, visited the Mechanical Handling Exhibition at Earls Court, London. The trip, subsidized by the firm, enabled employees to see the many exhibits of the firm. For demonstration purposes two Morris mobile cranes were in the grounds by the main buildings. There was included a comprehensive display of both standard and new products; several new types of electric hoists and new pulley blocks also were shown.

THE INSTALLATION of the natural-gas pipeline in west Pakistan running 212 miles from the Sui gasfield in Baluchistan to Multan in the Punjab is due to begin in December. The contract, worth about £2,000,000, has been awarded to Pakistan Constructors, the joint venture of D. & C. William Press, Limited, London, and the Morrison-Knudsen International Corporation, San Francisco. One half of the pipe for the contract is being supplied by Stewarts and Lloyds, Limited, and the other half by Dalmine, the Italian concern.

THE APPEARANCE of the entrance to West Bromwich Town Hall has been enhanced by bronze handrails and balustrade given by the directors of the Great Bridge Foundry Company, Limited, Sheepwash Lane, Great Bridge. The gift was to commemorate the fact that two members of the company had been mayors of the Borough—Alderman J. J. Grant, ten years ago, and Mrs. E. Wimifred Grant this year. The Mayor, the wife of Alderman J. J. Grant, received the gift on behalf of the town from Mrs. W. H. L. Harrison, wife of the company's managing director.

Iron-ore Imports

Iron-ore imports in April, and the total for the first four months of this year compared with the corresponding period of 1955, are shown below.

Destination.	Month ended April 30.	Four months ended April 30.	
	1956.	1955.	1956.
	Tons.	Tons.	Tons.
Sierra Leone	96,820	210,243	250,014
Canada	—	79,615	165,669
Other Commonwealth countries and Eire	885	4,812	5,312
Sweden	317,859	1,118,434	1,197,766
Norway	9,764	20,184	32,765
Western Germany	—	15,843	2,960
France	39,607	214,888	188,904
Portugal	12,458	24,521	35,813
Spain	110,055	267,455	293,504
Algeria	127,450	738,668	491,389
Tunisia	53,640	223,484	270,012
French Morocco	47,600	87,529	148,064
French West Africa	74,739	178,917	278,527
Spanish Morocco	28,535	77,145	96,723
Liberia	55,520	104,087	134,278
Brazil	41,545	131,405	179,089
Other foreign countries	70,783	22,007	182,770
TOTAL	1,087,260	3,519,237	3,953,559

Vickers' Overseas Activities

Vickers, Limited, has acquired a controlling interest in Canadian Vickers, Limited, which it founded in 1911 and operated until 1927. An essential part of the transaction is that 45 per cent. of the stock remains in the hands of existing shareholders. Mr. J. E. Labelle, chairman, and Col. O. H. Barrett, president, will continue in office with the Canadian company, which has works and shipyards at Montreal, but representatives of Vickers, Limited, will join the board in due course.

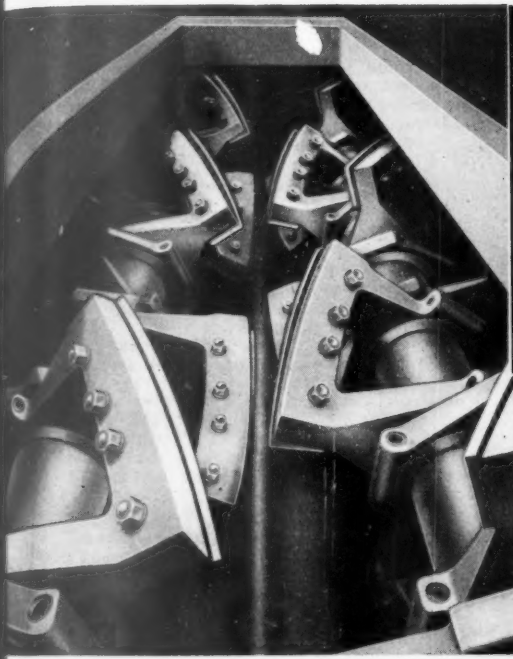
A company has been formed in Melbourne by Vickers, Limited, under the name of Vickers Australia Pty., Limited, to take over its Australian investments, *viz.*, in Cockatoo Docks & Engineering Company Pty., Limited, Vickers Ruwolt Proprietary, Limited, and Vickers-Armstrongs (Australia) Pty., Limited. The acquisition of a 75 per cent. interest in Hoskins Engineering & Foundry Pty., Limited, Perth, is announced by the Vickers group, and this will be carried out by the new company.

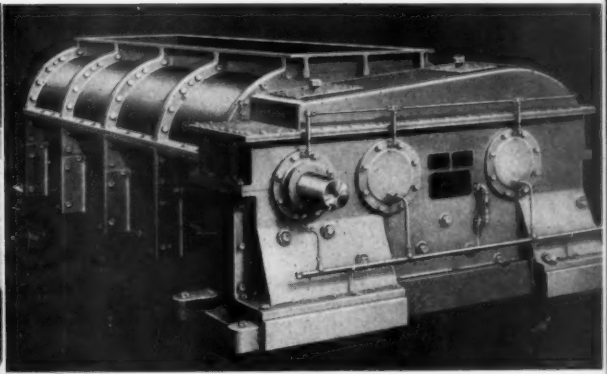
Recents Wills

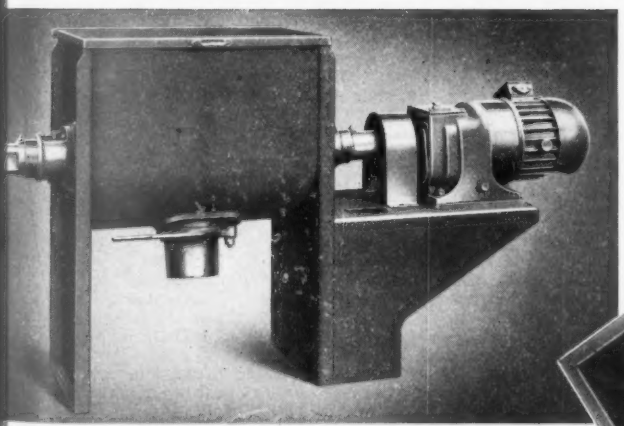
ABELL, C. F., senior partner of William O. Abell, engineers and iron and brass founders, of Derby £4,466

STEWARD, R. G., a director of Mann, Egerton & Company, Limited, electrical and motor-car engineers, of Norwich £71,055

FOUNDRY EQUIPMENT —
Batch and Continuous Sand Mixers







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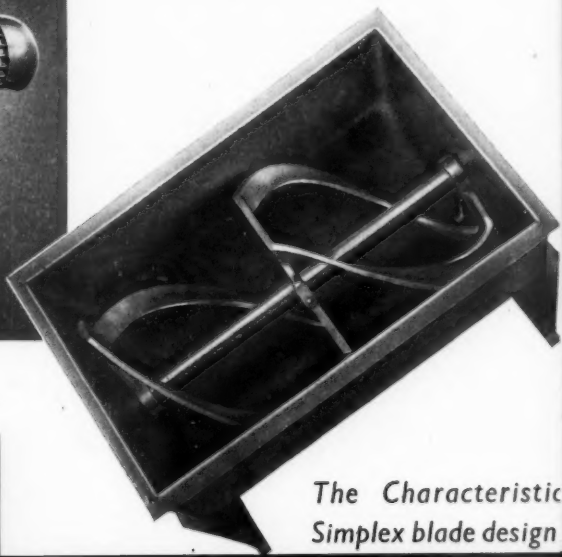
Built in standard sizes with continuous outputs of 6 tons to 120 tons per hour of thoroughly aerated and homogeneously mixed moulding sand.



TCH MIXERS Made in a variety of sizes.

The Characteristic Simplex blade design

BAKER PERKINS LTD
Engineers
WESTWOOD WORKS - PETERBOROUGH

Publications Received

Danger—Office Staff at Work; published by the Royal Society for the Prevention of Accidents, 38, Millbank, London, S.W.1. Single copy 6d., 100 for 37/6.

Office managers being generally staid and sober are unlikely to appreciate this 16-page pamphlet. The pitfalls enumerated are pretty much the same as are encountered in the home.

Noble Metal Thermocouples, by H. E. Bennett, F.I.M.; issued by Johnson Matthey & Company, Limited, 73-83 Hatton Garden, London, E.C.1.

This is a reliable, nicely illustrated 36-page book, which in a very interesting way, covers the field of noble-metal thermocouples. It is devoid of advertising beyond the listing of the firm's addresses throughout the world. Recipients of this book can indeed count themselves fortunate.

Non-ferrous Metal Industry in Europe. Published by the Organization for European Economic Co-operation, obtainable through HM Stationery Office, P.O. Box 569, London, S.E.1. Price 10s.

The review covers aluminium, copper, lead and zinc, tin and nickel. In each case information is given as to consumption, exports, stocks, metal production and imports. There is by way of an introduction a brief outline of developments in 1954 and the beginning of 1955.

Beginning of an Adventure. Issued by High Duty Alloys, Limited, Slough.

This well-produced booklet has been issued with the object of attracting apprentices to the firm. Not only is the letterpress excellent, but the inclusion of physical constants and maps has been done to pander to a boy's pride of knowledge in the first case and to excite his curiosity in the second. Rightly the curricula are reserved to the end, whilst the section on pay is not just guesswork as sometimes appears in publications of this nature. Parents with school-age boys should certainly write for a copy of this brochure.

Steel Foundry Dust Control and Ventilation. Report of a conference held at York in October 1955: Published by the British Steel Castings Research Association, Broomgrove Lodge, Sheffield, 10; price 42s.

The discussions of the eight papers presented at the above conference which are reported in this publication, are equally as interesting as the actual lectures. The subjects are well chosen and cover dust-control from grinding machines, knock-outs, and pneumatic tools; sampling; assessment of airborne dust; the efficiency of dust collectors, and foundry ventilating and heating. The section which appeals most to the reviewer is that dealing with knock-out ventilation, for here is to be found information on the subject not easily available elsewhere. It is not suggested that perfection has been achieved, but modern techniques are such that practical solutions are in sight. The book runs to about 100 pages and is well illustrated. The only improvement suggested is the inclusion of an index, despite the fact that much information is given in the contents list. As a reliable and authentic work of reference on this vexed subject of dust-control, it certainly is the best of British origin so far available.

Book Reviews

Modern Workshop Practice. Part I—Materials and Processes. Edited by Prof. H. Wright Baker; published by Cleaver-Hume Press Limited, 31, Wright's Lane, Kensington, London, W.8. Price 35s.

There are 20 chapters in this book, all of which are written by recognized authorities. For instance, the various sections dealing with foundry practice have been contributed by Dr. J. E. Garside, Mr. H. W. Fairbairn (die-casting) and Mr. D. N. Buttrey (shell moulding). In all, four chapters are devoted to this subject, and of these it can be said that they are reliable and wide in their coverage. To dwell on foundry practice only would be an injustice to the book as it constitutes but a fifth of the contents.

The value of the balance of the contents to the foundryman-reader is that he can get a good picture of kindred subjects. The modern executive concerned with the manufacture of castings should have some knowledge of iron and steel, powder metallurgy, forging, steel sheet and strip, welding, aluminium and magnesium, nickel and high-nickel alloys, copper and copper alloys, plastics and mechanical testing. These are all not only general-knowledge subjects, for under many of these headings much information is given about foundry alloys. As a number of people have contributed to this book, the editor is to be congratulated on having completely eliminated overlapping. It is claimed that the book is well suited for senior students in engineering and the reviewer can wholeheartedly endorse this claim in so far as it relates to specific subjects set out in the title. Moreover, the book is reasonably priced. V.C.F.

Emaillage de la Tole D'Acier et de la Fonte (Enamelling of Sheet Steel and Cast Iron). A symposium published by *Editions Techniques des Industries de la Fonderie,* 12, Avenue Raphael, Paris 16. Price, 1,850 francs.

This volume contains a series of papers presented by different authors at a course organized for practical men from the enamelling industry. Edited by the French Foundrymen's Association, it deals with the scentific background of the enamelling industry and a description of the enamelling process of sheet and cast iron. It is a publication which will fill a gap in French technical literature and that of other countries. It gives to the practical man scientific explanations for practices and processes already known to him, and these explanations are kept at a level at which they can easily be absorbed by men who have not had a high technical education.

First the physico-chemical aspects of enamels, their raw materials and compositions, are dealt with, and in general terms the influence of chemical composition on physical properties of enamel is described. Then the book turns to the manufacture of enamelling frit, and tests which can be applied by the enameller when a new frit is supplied to him. A very valuable section deals with different kinds of steel and its fabrication. It contains a good description of enamelling steel, how it is made, and its differences from other kinds of steel. Then a series of articles deals with preparation of sheet steel for enamelling, and also methods of enamelling it. The section dealing with faults in sheet-iron enamelling, causes and cures, seems to be rather short. The last part, covering cast iron and its enamelling, concentrates attention on the majolica finish, so characteristic of the French cast-iron enamelling.

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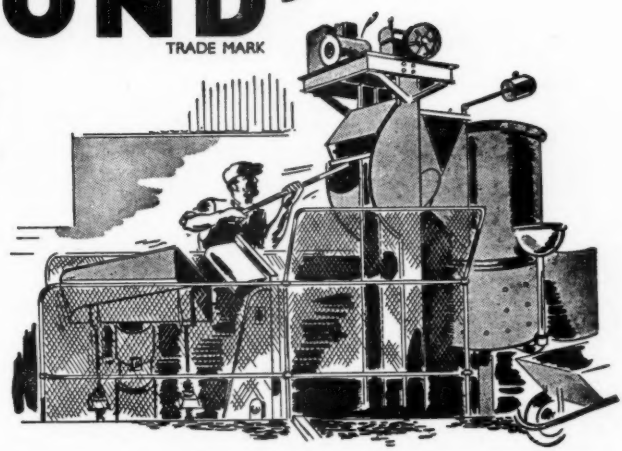

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Personal

MR. R. S. BUSHNELL has resigned his position with B.I.P. Chemicals, Limited, to join the staff of Foundry Services, Limited.

MR. A. P. L. SULLIVAN has accepted an appointment as technical consultant to the Plastidry fire hose division of British Tyre & Rubber Company, Limited.

MR. S. F. STEWARD, managing director of Lancashire Dynamo Holdings, Limited, has become chairman of its subsidiary—Lancashire Dynamo Electronic Products, Limited.

The directors and staff of William Doxford & Sons, Limited, Sunderland, have made a presentation to MR. LEWIS DENT, chief cashier in the engineering department, on his retirement after 46 years with the company.

MR. R. L. HERRING, managing director of the Lamson Engineering Company, Limited, and MR. C. M. VIGNOLES, managing director of Shell-Mex & B.P., Limited, have been elected wardens of the Turners' Company.

The Council of the Institute of Fuel has elected MR. JOHN R. RYLANDS as president for 1956/57. He will take office in October. Mr. Rylands is chief engineer and director of E. Green & Son, Limited, Wakefield, Yorks.

MR. RALPH PARISH has taken over control of the whole of the engineering division of the Yorkshire Die-Casting Company, Limited, and is now general manager of Hawkhead, Bray & Son, Limited, the Yorkshire Die-Casting Company, Limited, Ottewell & Denton, and Metal Hardeners.

MR. ANDREW C. SMITH has been appointed to the executive board of G. J. Weir, Limited, Cathcart, Glasgow. Mr. Smith, who commenced his apprenticeship with Weirs in 1930, was appointed manager of the London office in January, 1948. He will now return to the head office in Glasgow as sales director.

In addition to Mr. H. W. A. WARING, whose appointment has already been announced, MR. L. R. P. PUGH, A.C.A., has been appointed to the board of Guest Keen Iron and Steel Company, Limited. Mr. Pugh was formerly with Deloitte Plender Griffiths & Company and joined the company in 1947; he was appointed secretary in 1951.

On the occasion of his 60th anniversary with the firm of Keith Blackman, Limited, Tottenham, London, N.17 (June 16), MR. M. BURNINGHAM will retire from his offices as chairman and director. Mr. D. S. WOODLEY, present managing director and deputy chairman, who has served the company for the past 40 years, has been elected to succeed him as chairman.

Mr. JOHN WILSON ELLIOTT, chairman of Swan, Hunter, & Wigham Richardson, Limited, Wallsend, was invested as a Commander of the Royal Order of Saint Olav by Crown Prince Olav of Norway at a ceremony on board the new liner Bergensfjord at Oslo on May 18. The award, of which Mr. Elliott had no previous knowledge, was given for services to Norwegian shipping.

Mr. L. C. W. TURNER, sales director, Brush Electrical Engineering Company, Limited, Loughborough, represented the firm at the convention of the International Electrical Association at Stresa, Italy, which was arranged for discussions and interchange of information connected with the manufacture of various electrical equipment and plant. The conference was held from May 14 to 18.

MR. I. J. O'HEA, chairman and managing director of Colt Ventilation, Limited, and W. H. Colt (London), Limited, who has been on a two-month tour of the United States and Canada, will return to England at the end of this month. The main purpose of Mr. O'Hea's visit was the finalizing of the formation of the company's new American company in Los Angeles, California, which is to be known as Colt Ventilation of America, Inc.

Three employees of Richard Thomas & Baldwins, Limited, have recently become Justices of the Peace. They are Mr. EDWARD MILLINGTON, who has been general manager of the Panteg section since January, 1951, Mr. JOHN S. DAVIES, who was appointed manager of the Clayton tinplate works in 1951, having started there in 1912 at the age of 14, and Mr. WALTER DARBY, an employee at Ebbw Vale since 1919 and catering manager there since 1940.

Sir HAROLD WEST, who retired earlier this month from the managing directorship of Newton, Chambers & Company, Limited, has been appointed chairman of the advisory panel in connection with a study tour of Sheffield to be made in July by 16 members of the Duke of Edinburgh's study conference at Oxford in July on "Human Problems of Industrial Communities within the Commonwealth and Empire," which is being held at Oxford. The party will visit the Thorncliffe works of Newton, Chambers.

A wish to resign from the chairmanship of the Advisory Council of the Department of Scientific and Industrial Research has been expressed by Sir HUGH BEAVER and this intimation has been accepted with regret by the Lord President of the Council, whose invitation to Sir HARRY JEPHCOTT to become chairman has been accepted. Sir Harry, who is 65, is chairman and managing director of Glaxo Laboratories, Limited, serves on the boards of its subsidiaries, and is a director of the Metal Box Company, Limited.

The Committee of British Employers Operating Abroad has appointed Mr. A. C. MAIN, a director of the Metropolitan-Vickers Electrical Company, Limited, as its vice-chairman. Mr. W. W. VINSEN, a director of the British Thomson-Houston Company, Limited, has been reappointed chairman. New executive committee members are Mr. G. E. JEWELL, a director of the London Electric Wire Company & Smiths, Limited, Mr. R. E. LEAPINGWELL, of Aiton & Company, Limited, and Mr. A. S. PEACOCK, of Babcock & Wilcox, Limited.

MR. JOHN SPENCER RIVAZ has been appointed technical sales manager to Smith Aircraft Instruments as from June 1, in succession to MR. A. I. O. DAVIES, who is leaving the company. Mr. Rivaz is at present technical services manager to Kelvin & Hughes (Aviation), Limited, one of the Smith Group of aviation companies. MR. DOUGLAS G. JOHNSON, who was deputy technical sales manager and personal assistant to MR. LEONARD MORGAN, director and general manager of Smith Aircraft Instruments, has been appointed contracts manager to the company.

A director of the Steel Company of Wales, Limited, since its formation, Mr. S. E. GRAEFF has left Port Talbot to take up residence in the United States. In August, 1954, Mr. Graeff relinquished his position as an executive director and, while still remaining on the board, assumed the role of a consultant to the company. He now feels that in order to carry out his duties as a consultant it is essential for him to keep in closer touch with American steel practice. His position as a director of the company is unaffected by the move, and Mr. Graeff expects to make regular visits to this country for consultation.

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Raw Material Markets

Iron and Steel

Most foundries continue to record good outputs, the most favourably situated being those sections of the engineering foundries supplying high-duty castings to collieries, steelworks, machine-tool makers, agricultural implement manufacturers, and other trades enjoying good order-books. The demand for castings from the motor trades has shrunk to such an extent as to compel some foundries to resort to a four-day working week. This recession, which is considered to be of a temporary nature, has had little effect on the demand for pig-iron. The low-phosphorus grades generally are fully taken up, with output now about equal to requirements. Hematite can be obtained more easily than was the case a few months ago, although difficulty is still being experienced in obtaining the higher silicon iron of over 3 per cent.; the ore situation is causing concern to producers and is affecting outputs.

Many of the light foundries continue to have difficulty in finding sufficient work to keep plants fully employed. Some sections are better employed than others, depending on the trades supplied, but there is a dearth in the call for castings for domestic utensils and requirements of builders' castings are not heavy. Jobbing foundries are fairly busy, but the textile foundries could undertake more work. The supply of high-phosphorus iron is steady and generally equal to demands, although outputs are now reduced.

The ovens are keeping consumers supplied with foundry coke, although there is still a shortage of some of the Welsh grades. Ganister, limestone, and firebricks are coming forward without delay. Arisings of heavy cast iron and machinery scrap are readily accepted, while light scrap is now more plentiful.

The steel semis which the re-rollers have in stock, coupled with day-to-day deliveries from home steelworks, are sufficient to enable them to maintain outputs of small bars, light sections, etc., reasonably well. Stocks of steel billets, etc., are now, however, much lower than they were when appreciable consignments were being sent from abroad, and the tonnages now being received, almost entirely from home steelworks, only just cover consumption. Hopes are expressed that larger tonnages will be forthcoming from oversea.

The high demand continues from home consumers for small bars, sections, strip, etc., and the mills have sufficient work on hand to obtain capacity outputs, although some of them are handicapped by labour shortage. All arisings of defective billets, crops, etc., are readily accepted.

Non-ferrous Metals

Copper slumped below £300 a ton in London on Tuesday morning, following quite a train of discouraging effects. It all started last week when with demand only modest the market was in no shape to withstand the news that US Custom smelters had lowered their price by 2 cents to 43 cents a pound. Worse followed this week with two consecutive cuts to bring the level to 40 cents. To some extent a further weakening effect last week was the announcement that the Rhodesian Selection Trust group is proposing to bring its Chambishi mine into production and to raise Mufulira's output by 50 per cent., even though optimism may be a little premature as these projects depend on the completion of the Kariba Gorge scheme and the availability of adequate railway capacity.

Moreover, the feeling is now that the price will go lower. Demand is only modest, several bear accounts have already been covered, and supplies improve daily. The downward trend has been underlined by the fixing of the RST copper price at £320 a ton at the weekend —a drop of £30 a ton on the old price of £350.

While the London price is at least realistic no such picture is presented by the US primary producers, who are still holding their price at the 46-cent level, even in the face of indifferent demand, news of increased production, and a steep decline in fabricators' sales. It would seem that the only reason for the determination to hold the price is the approaching wage negotiations; even then for the first time the feeling is growing that these negotiations may be completed smoothly.

The tin market is also weakening in London and there is some apprehension over the appearance of soft spots in the US economy. Demand is quiet on both sides of the Atlantic.

Lead has been the strongest of the metals and is steady in London and New York. On this side this has been due more to the reduced offerings of the metal, than to any real expansion of demand. Zinc, which hitherto has held up well in weak markets, is now turning soft, with a lack of inquiry for ordinary grades. For special high-grade metal the price is also falling away.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* May 24, £313 to £314; May 25, £304 to £305; May 28, £309 to £309 10s.; May 29, £297 to £297 10s.; May 30, £301 10s. to £302.

Three Months: May 24, £309 to £309 10s.; May 25, £302 to £302 10s.; May 28, £305 10s. to £306 10s.; May 29, £295 10s. to £296; May 30, £298 10s. to £299.

TIN, Standard—*Cash:* May 24, £752 to £753; May 25, £747 10s. to £748; May 28, £741 10s. to £742 10s.; May 29, £731 10s. to £732 10s.; May 30, £730 to £731.

Three Months: May 24, £752 to £753; May 25, £748 to £748 10s.; May 28, £741 10s. to £742 10s.; May 29, £732 to £732 10s.; May 30, £730 to £731.

LEAD—*Second half May:* May 24, £110 15s. to £111; May 25, £111 10s. to £111 15s.; May 28, £111 15s. to £112 5s.; May 29, £112 to £113; May 30, £112 to £112 5s.

Second half August: May 24, £108 15s. to £109; May 25, £108 10s. to £108 15s.; May 28, £108 15s. to £109; May 29, £108 5s. to £108 10s.; May 30, £108 to £108 5s.

ZINC—*Second half May:* May 24, £92 15s. to £93; May 25, £93 10s. to £93 15s.; May 28, £93 15s. to £94; May 29, £92 10s. to £92 15s.; May 30, £93 to £93 5s.

Second half August: May 24, £90 15s. to £91; May 25, £91 5s. to £91 10s.; May 28, £91 to £91 5s.; May 29, £89 15s. to £90; May 30, £90 5s. to £90 15s.

Course for Crane-drivers and Slingers

The first one-day course for crane-drivers and slingers, organized by the Birmingham and District Industrial Safety Group, will be held at the Group's Training Centre, Summer Road, Acocks Green, Birmingham 27, on June 26. Applications to attend should be made to Mr. W. G. Appleyard, 21, Steelhouse Lane, Birmingham, 4, accompanied by the course fee of two guineas (which includes luncheon and refreshments).

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